

A taxonomic revision of *Diospyros* L. (Ebenaceae) in Australia

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Summary

Jessup, L.W. (2014). A taxonomic revision of *Diospyros* L. (Ebenaceae) in Australia. *Austrobaileya* **9(2)**: 155–197. The Australian taxa of the genus *Diospyros* are revised. Twenty two species (21 native and 1 naturalised) are recognised. Six species are described as new: *Diospyros granitica* Jessup, *D. peninsularis* Jessup, *D. pluviatilis* Jessup, *D. rheophila* Jessup, *D. uvida* Jessup and *D. yandina* Jessup and new combinations are made for *D. hemicycloides* (F.Muell. ex Benth.) Jessup (based on *Maba hemicycloides* F.Muell. ex Benth) and *D. laurina* (R.Br.) Jessup (based on *Maba laurina* R.Br.). Descriptions, distribution maps, illustrations and identification keys based on male or female material are provided.

Key Words: Ebenaceae, *Diospyros*, *Diospyros areolifolia*, *Diospyros australis*, *Diospyros calycantha*, *Diospyros compacta*, *Diospyros fasciculosa*, *Diospyros geminata*, *Diospyros granitica*, *Diospyros hebecarpa*, *Diospyros hemicycloides*, *Diospyros humilis*, *Diospyros kaki*, *Diospyros laurina*, *Diospyros littorea*, *Diospyros mabacea*, *Diospyros maritima*, *Diospyros peninsularis*, *Diospyros pentamera*, *Diospyros pluviatilis*, *Diospyros rheophila*, *Diospyros rugosula*, *Diospyros uvida*, *Diospyros yandina*, Australia flora, taxonomy, new species, identification key, distribution maps

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Introduction

Diospyros L. is a pantropical and subtropical genus of over 500 species (Frodin 2004; Wallnöfer 2001, 2004). Robert Brown (1810) was the first to describe Australian species under the genera *Diospyros* L., *Maba* J.R.Forst. & G.Forst. and *Cargillia* R.Br. Bentham (1868) continued to recognise these three genera although Mueller (1867) had transferred several species described by Brown and himself under *Maba* and *Cargillia* to *Diospyros*. Hiern (1873) and Bailey (1900) continued to recognise the genus *Maba* but not *Cargillia*. Bakhuizen van den Brink (1936–1955) produced a multilevel classification of *Diospyros* recognising *Maba* and *Cargillia* as subgenera along with three other subgenera not represented in Australia. He also placed several Australian species under the large *D. ferrea* (Willd.) Bakh. group of taxa. Kostermans (1977) considered *D. ferrea* to be confined to India and Ceylon (Sri Lanka) and reinstated several Australian taxa to species under *Diospyros*. Smith (1981) followed

Kostermans and rejected the broad concept of *D. ferrea* in his treatment of *Diospyros* in Fiji.

Attempts at infrageneric classification since Bakhuizen van den Brink (1936–1955) have been proposed by White (1980) and Singh (2005) but molecular studies of Duangjai *et al.* (2006, 2009) reveal 11 well-resolved major clades in *Diospyros* and indicate that all earlier infra-generic classifications are artificial. The authors acknowledge that although their study is the most extensive to date for *Diospyros*, the sampling is still too limited to propose with confidence a new infrageneric classification.

Materials and methods

This revision is based on herbarium collections in BM, BRI, CANB, CNS (previously QRS), E, K, L, MEL and NSW and some field observations by the author. All specimens cited have been seen by the author. Descriptions of flowers were prepared from material preserved in FAA or 70% alcohol and glycerol or reconstituted by briefly boiling in water. The descriptions of fruit were prepared from both dried and alcohol preserved material. Common abbreviations in the specimen citations are FR (Forest Reserve),

LA (Logging Area), NP/NPR (National Park/ National Park Reserve), R (Reserve), SFR/ SF (State Forest Reserve/State Forest), TR (Timber Reserve). Electronic images of type specimens at the JSTOR website are indicated as “online image!”.

Taxonomy

Diospyros L., *Sp. Pl.* 1057 (1753). **Type species:** *Diospyros lotus* L. (lecto: *fide* Britton & Brown 1913: 720).

Maba J.R.Forst. & G.Forst., *Char. Gen. Pl.* 61, t. 61 (1775); ed. 2: 121, t. 61 (1776); ed. 3: 61, t.61 (1776); *Diospyros* L. section *Maba* (J.R.Forst. & G.Forst.) Hiern (as section *Ferreola* *nom. illegit.*); section *Maba* (J.R.Forst. & G.Forst.) Singh, *Monogr. on Indian Diospyros (Persimmon, Ebony) Ebenaceae* 23 (2005), *comb. superfl.* **Type species:** *Maba elliptica* J.R.Forst. & G.Forst.

Cargillia R.Br., *Prodr.* 526 (1810); *Diospyros* section *Cargillia* Hiern, *Trans. Cambridge Philos. Soc.* 12: 146, 155 (1873). **Type species:** *Diospyros cargillia* F.Muell. *nom. inval. nom. nud.*

Diospyros subgenus *Cargillia* (R.Br.) Bakh., *Gard. Bull. Straits Settle.* 7: 162 (1933). **Type species:** not designated.

Trees or shrubs, commonly dioecious, rarely monoecious, andromonoecious or polygamomonoecious. Indumentum of simple hairs or 2-armed with one arm very short (submedifixed). Wood commonly hard and dark, latex absent. Leaves simple, alternate, usually distichous, entire, often with nectaries on underside, petiolate, exstipulate. Inflorescence axillary, determinate, cymose in males, often solitary flowers in females. Flowers actinomorphic,

hypogynous, unisexual, bracteate. Staminate flowers with vestigial ovary. Pistillate flowers with or without staminodes. Calyx gamosepalous, persistent, often accrescent in fruit, 3–6-lobed, lobes valvate. Corolla gamopetalous, 3–6-lobed, lobes imbricate or contorted. Stamens adnate to base of corolla tube or attached to receptacle, isomerous, diplostemonous or polystemonous; when isomerous alternate with corolla lobes, when diplostemonous then in 2 cycles; anthers usually linear-lanceolate or oblong; longer than filaments; filaments free or connate at base, often connate in pairs alternating with singles; glabrous or variously pubescent; anthers bilocular, dehiscent by longitudinal slits or these sometimes initially resembling apical pores; pollen grains tricolporate. Gynoecium of 2–8–connate bioovulate carpels as indicated by the number of styles or stigmas, each carpel with a longitudinal false secondary septum and then each locule appearing 1-ovulate, or without a false septum and 2-ovulate, with apical-axile placentation; ovules pendulous, oblong, anatropous with 4, 6, 8, 10, 12, 14 or 16 per ovary. Ovary commonly pubescent, sometimes glabrous; styles distinct or connate, sometimes obscure; stigmas often bifid. Fruit a leathery or fleshy berry, pubescent, glabrate or glabrous; seeds 1–10(–16), pendulous, usually oblong and laterally compressed, often segment shaped, with thin testa and abundant, hard, often ruminant endosperm; embryo straight or curved, cotyledons foliaceous.

A genus of over 500 species worldwide, in Asia, tropical Africa, South America, tropical and subtropical regions of Australia and Pacific islands. In Australia a genus of one naturalised and 21 native species, 13 endemic.

Key to Australian species of *Diospyros* using male flowers

- 1 Flowers 4–6-merous; filaments adnate to corolla tube 2
1. Flowers mostly 3-merous (rarely 4 or 5-merous); filaments not adnate to corolla tube . . . 12
- 2 Filaments glabrous or with a few short appressed hairs 3
2. Filaments pubescent or puberulent, hairs generally not appressed 8

- 3 Petiole and midvein glabrous; petiole nearly flat above; calyx lobed to less than one quarter of its length; lobes 0.4–1(–1.5) mm long; corolla tube 6–8 mm long 4
- 3. Petiole and midvein not glabrous; petiole channelled adaxially; calyx lobed to two thirds of its length; lobes 1–2.5 mm long; corolla tube 1–3 mm long 6
- 4 Stamens less than 12; free part of filaments and base of anthers and connectives with short appressed hairs 3. **D. uvida**
- 4. Stamens 12 or more; filaments and connectives glabrous or with a few scattered hairs 5
- 5 Inflorescence with 1–3 flowers; hairs on pedicel and corolla white to grey 1. **D. calycantha**
- 5. Inflorescence with 3–10 flowers; hairs on pedicel and corolla pale to orange-brown 2. **D. hebecarpa**
- 6 Secondary veins 4 or 5 pairs; corolla outside more or less glabrous; pistillode glabrous 4. **D. rugosula**
- 6. Secondary veins 9–15 pairs; corolla outside pubescent; pistillode pubescent 7
- 7 Twig hairs pale brown; secondary veins abaxially prominently raised; corolla tube 2–3 mm long; corolla lobed from one half to two thirds its length; pistillode 1–1.5 mm long 22. **D. mabacea**
- 7. Twig hairs white or grey; secondary veins abaxially flush or indistinct; corolla tube 1–1.5 mm long; corolla lobed to at least two thirds its length; pistillode 2.5–3.5 mm long 20. **D. australis**
- 8 Filaments with long dense hairs, 0.5–1 times length of anthers 9
- 8. Filament hairs *c.* 0.1 mm long, much shorter than anthers 10
- 9 Lamina discolorous, usually light grey-green below; apex acute, sometimes acuminate or obtuse; filaments 0.5–1.5 mm long; anthers linear to lanceolate, 2–3 mm long 21. **D. pentamera**
- 9. Lamina concolorous or slightly discolorous; apex mostly acuminate; filaments 2.5–2.75 mm long; anthers ovate, 1–1.25 mm long 19. **D. granitica**
- 10 Lamina hairs on underside mostly erect, curved or sometimes tortuous, more dense along the veins; midvein pubescent adaxially; anthers 4–5 mm long 7. ***D. kaki**
- 10. Lamina either glabrous or the hairs when present sparse, appressed and straight, mostly confined to the main veins abaxially, midvein glabrous adaxially; anthers less than 3 mm long 11
- 11 Lamina glands (nectaries) on underside scattered along basal half of lamina, less than 0.5 mm across; each inflorescence with mostly 10–30 flowers. 6. **D. fasciculosa**
- 11. Lamina glands on underside 1(–2) on each side of midvein confined to extreme base of lamina, more than 1.5 mm across; inflorescence with less than 10 flowers 5. **D. maritima**
- 12 Rheophytic tree, lamina 0.8–1.7 cm wide; 4–5 times longer than wide; obtuse at apex; restricted to Roaring Meg Ck catchment, NE Qld 18. **D. rheophila**
- 12. Not rheophytic; lamina length frequently less than 4 times width, apex various 13

- 13 Lamina when dry with prominent reticulate venation, nearly as prominent as secondary veins 14
13. Lamina when dry with relatively obscure reticulate venation compared to the secondary veins 15
14. Twigs usually with relatively persistent short erect hairs (sometimes not evident in southern populations) and scattered longer appressed submedifixed hairs 8. **D. compacta**
- 14 Twigs glabrescent, without erect hairs, only sparse appressed submedifixed hairs. 9. **D. areolifolia**
- 15 Stamens (2–)3–5 16
15. Stamens mostly 6–9 18
- 16 Midvein raised above 16. **D. peninsularis**
16. Midvein not raised above 17
- 17 Lamina mostly 1–3 cm wide; secondary veins 15–30 pairs; petiole 2–3 mm long, strigose; inflorescence mostly axillary; corolla tube 4–4.5 mm long 15. **D. yandina**
17. Lamina mostly 3–5.5 cm wide; secondary veins 7–15 pairs; petiole 3–5 mm long; inflorescence cauline, ramal and axillary; corolla tube 1.5–2 mm long 17. **D. pluviatilis**
- 18 Corolla tube 8–11 mm long; stamens 7–8.7 mm long; filaments 3.5–4 mm long, anthers 4–4.5 mm long 13. **D. laurina**
18. Corolla tube to 4 mm long; stamens to 3.5 mm long, filaments to 2 mm long, anthers to 2.5 mm long 19
- 19 Youngest twigs with more or less persistent minute erect hairs as well as caducous appressed hairs 20
19. Youngest twigs glabrous or with caducous appressed hairs, minute erect hairs absent 21
- 20 Lamina elliptic, oblanceolate or lanceolate, 3.5–10 cm long, acute or acuminate at apex; margins sometimes undulate, inflorescence bracts suborbicular, 0.25–0.3 mm long; pistillode 1–2.5 mm long 14. **D. hemicycloides**
20. Lamina obovate, rarely elliptic, rarely more than 3.5 cm long, obtuse or rounded at apex; margins often recurved, inflorescence bracts obovate, 1.5–2 mm long; pistillode 0.5–1 mm long 10. **D. humilis**
- 21 Secondary veins 5–8 pairs. Inflorescence frequently with more than 7 flowers; inside of calyx with appressed hairs 11. **D. geminata**
21. Secondary veins 10–15 pairs. Inflorescence with up to 7 flowers; inside of calyx glabrous 12. **D. littorea**

Key to Australian *Diospyros* species using fruit and female flowers

- 1 Staminodes present. Flowers 4 or 5 (or 6)-merous. Ovary (3-)4 or 8-locular with 1 or 2 ovules per locule, a total of (6) or 8 ovules; fruiting calyx 4–6-lobed. 2
1. Staminodes absent. Flowers 3-merous (rarely 4 or 5-merous); ovary (2–)3(–6)-locular, with (1) or 2 ovules per locule, a total of 4 or 6 ovules; fruiting calyx 3-lobed (rarely 4 or 5-lobed) 12

- 2 Lamina glabrous on underside before full expansion 3
- 2. Lamina puberulous to pubescent on underside, glabrescent at full expansion. 6
- 3 Flowers 3–10 on each axis, the calyx lobes 2–2.5 mm long; corolla lobes 2.5–3 mm long; corolla tube 2–2.5 mm long; fruiting calyx tube glabrous inside; margin of calyx tube not elevated above base of lobes, fruit several in each axil or sometimes solitary **6. D. fasciculosa**
- 3. Flowers solitary; calyx lobes 4.5–11 mm long; corolla lobes 9–10.5 mm long; corolla tube 4–6.5 mm long; fruiting calyx tube pubescent inside; margin of calyx tube more or less elevated above base of lobes, fruit solitary 4
- 4 Corolla lobes less than 5 mm long; ovary and style glabrous or with few hairs; fruit 15–18 mm diameter, glabrous **1. D. calycantha**
- 4. Corolla lobes more than 5 mm long. Ovary and style densely pilose or pubescent; fruit more than 20 mm diameter, pubescent 6
- 5 Corolla lobes 5.5–6.5 mm long, fruit 30–40 mm diameter, pubescent with erect pale reddish brown hairs **2. D. hebecarpa**
- 5. Corolla lobes 9–10.5 mm long, fruit 22–25 mm diameter, appressed pubescent with white or pale brown hairs **3. D. uvida**
- 6 Fruiting calyx lobes and tube cupular; the calyx appressed to base of fruit throughout; fruit 9–15 mm wide 7
- 6. Fruiting calyx tube cupular and appressed to base of fruit, the lobes spreading or reflexed, or whole calyx flat or reflexed; fruit 15–35(–90) mm wide 9
- 7 Lamina hairs, on abaxial surface minute, less than 0.25 mm long; pistillode c. 2 mm long; staminodes glabrous; ovary 2.5–3 mm long **20. D. australis**
- 7. Lamina hairs, on abaxial surface more than 0.25 mm long; pistillode 0.75–1.5 mm long; staminodes with long dense hairs at apex; ovary 1.5–2 mm long 8
- 8 Lamina concolorous, dull green or drying brown, apex acuminate; calyx lobes on fruit indistinct or broadly deltate; 0–2 mm long **19. D. granitica**
- 8. Lamina discolorous, light green beneath, apex acute or obtuse; calyx lobes on fruit distinctly deltate, 2–4 mm long **21. D. pentamera**
- 9 Fruiting calyx lobes 2–6 mm long **10**
- 9. Fruiting calyx lobes 6–20 mm long. **11**
- 10 Twig sericeous; lamina tip acuminate or acute; lamina glands sparse; secondary veins indistinct or slightly depressed above; calyx lobes on fruit oblong **22. D. mabacea**
- 10. Twig glabrous or strigose; lamina tip obtuse or rounded; lamina glands 1–3 near base; secondary veins raised above; calyx lobes on fruit deltate or indistinct **5. D. maritima**
- 11 Petiole 2–6 mm long; flower 5–6 mm long; style 0.4–0.6 mm long; calyx tube on fruit up to 3 mm long, fruit 17–25 mm long **4. D. rugosula**
- 11. Petiole 10–25 mm long; flower 15–25 mm long; style 3–4 mm long; calyx tube on fruit 7–10 mm long, fruit 30–40 mm long. **7. *D. kaki**

- 12 Corolla tube 7–8 mm long, lobes 4–5 mm long; fruiting calyx becoming indurated (thickened and woody), densely appressed sericeous or pubescent outside **13. D. laurina**
12. Corolla tube up to 4.5 mm long, lobes up to 3 mm long; fruiting calyx thin, not indurated, sparsely appressed puberulous, glabrescent outside **13**
- 13 Flowers usually in pairs or threes, only a few may be solitary. **14**
13. Flowers mostly solitary in each axil **16**
- 14 Fruiting calyx lobed for more than half its length, more or less flat, not cupular **17. D. pluviatilis**
14. Fruiting calyx lobes much shorter than the cupular tube. **15**
- 15 Ovary glabrous, fruiting calyx lobes spreading or reflexed **6. D. fasciculosa**
15. Ovary sericeous, fruiting calyx lobes appressed to the fruit, not spreading or reflexed. **11. D. geminata**
- 16 Rheophytic tree, lamina 0.8–1.7 cm wide; 4–5 times longer than wide; obtuse at apex; restricted to Roaring Meg Creek catchment, NE Qld **18. D. rheophila**
16. Not rheophytic, lamina length frequently less than 4 times width; more widespread distribution **17**
- 17 Lamina when dry with prominent reticulate venation on both surfaces, nearly as prominent as secundar veins **18**
17. Lamina when dry with relatively obscure reticulate venation compared to the secondary veins **19**
- 18 Twigs usually with relatively persistent short erect hairs (sometimes not evident in southern populations) and scattered longer appressed submedifixed hairs. **8. D. compacta**
18. Twigs glabrescent, without erect hairs, only appressed submedifixed hairs that soon fall **9. D. areolifolia**
- 19 Midvein raised on adaxial surface of lamina **16. D. peninsularis**
19. Midvein not raised on adaxial surface of lamina **20**
- 20 Ovary glabrescent or glabrous except for a few hairs around style **21**
20. Ovary sericeous **22**
- 21 Young stems and petioles with sparse appressed submedifixed hairs, erect hairs absent; peduncle of fruit 2–3 mm long **12. D. littorea**
21. Young stems and petiole with dense short erect hairs and scattered appressed hairs; peduncle of fruit 0.5–1 mm long **10. D. humilis**
- 22 Twig indumentum glabrescent; secondary veins 5–12 pairs; flowers 3–5 mm long; corolla tube 2.5–3 mm long peduncle 3–7.5 mm long **14. D. hemicycloides**
22. Twig indumentum persistent; secondary veins 15–30 pairs; flowers 5–6 mm long; corolla tube 3–7 mm long, peduncle *c.* 1 mm long **15. D. yandina**

1. Diospyros calycantha O.Schwarz, *Repert. Spec. Nov. Regni Veg.* 24: 93 (1927). **Type citation:** [Northern Territory.] “Port Darwin, Jervais road, dry jungle, *F.A.K. Bleeser 156, 160, 161, 638*” (syn: B†). **Type:** Northern Territory. 3.2 km S of U.D.P. Falls, 2 October

1986, *M.J. Clark 698* (neo [here designated]: BRI); isoneo: DNA, *n.v.*)

Tree to 15 m, sometimes andromonoecious. Twigs with basifixed appressed hairs, that soon fall, and minute, more persistent dense or sparse erect hairs. Leaves: petiole 2–6 mm

long; lamina elliptic, 4.5–15 cm long, (1–)2.5–6.5 cm wide; base cuneate; glands mostly 3–7 scattered on each side of midvein on basal half of lamina, rarely absent; margins flat; apex obtuse or acute, glabrous above and below; secondary veins mostly 9–14 pairs, not prominent, tertiary veins inconspicuous. **Male** inflorescence shortly branched, to 2 mm long, mostly with 3–6 flowers; pedicels to 1.5 mm long, grey pubescent; calyx cupular, 2.5–2.7 mm long, shortly 4-lobed, lightly appressed pubescent inside. Corolla tube 6–8 mm long, lobes 4(–5), ovate or oblong, recurved, 3–4 mm long, with a few scattered grey hairs outside, glabrous inside. Stamens 14–16, unequal, 1.5–5.5 mm long, glabrous, filaments connate at base mostly in pairs and adnate to base of corolla tube; anthers linear, 1.2–1.6 mm long, connective produced; pistillode subglobose, hirsute at apex. **Female** flowers mostly solitary, peduncle 3–4 mm long; bracts and bracteoles persistent; calyx tube 3.5–4 mm long, lobes 4, rhomboid, depressed ovate or semiorbicular, mucronulate or not, spreading, 5–8 mm long, 7–8 mm wide, glabrous. Corolla tube 6–6.5 mm long, tubular but narrowed towards base, lobes 4, ovate, recurved, 3.5–4.5 mm long, apex acute. Stamines mostly 6 or 7. Ovary ovoid, with some appressed hairs at base, nearly glabrous towards style, 8-locular with 1 ovule per locule, style *c.* 3 mm long, stigmas shortly bilobed. Fruiting calyx tube cupular, appressed to base of fruit, lobes spreading or recurved, oblong, 6–8 mm long, glabrous; tube 3–4 mm long with an elevated rim, inside pubescent. Fruit depressed globose, or globose, 15–18 mm diameter, glabrous, orange to red, 5–7-seeded; seeds 10–14 mm long, 3–8 mm wide. **Fig. 1A–F.**

Additional selected specimens examined: **Western Australia.** 6 km S of Mining Camp in Crusher Vine Thicket, Mitchell Plateau, N Kimberley, Jan 1989, *Kenneally KFK10845 & Hyland* (DNA, PERTH). **Northern Territory.** Maxwell Creek, Melville Island, Jan 1990, *Russell-Smith 8169 & Lucas* (BRI); Hanguana jungle, Melville Island, Jan 1988, *Russell-Smith 4601* (DNA); Cobourg Peninsula, Wurgurlu Bay, Oct 1987, *Russell-Smith 3661 & Lucas* (BRI); Ginger Palmer's camp, Gunn Point, Oct 1990, *Russell-Smith 8345 & Brock* (BRI, MEL); Daly River, Mar 1989, *Brock 725 & Russell-Smith* (BRI); East Alligator River, Aug 1973, *Must 1147* (BRI, CANB, NSW); Lightning Dreaming,

Arnhem Land, Feb 1984, *Dunlop 6594 & Wightman* (BRI, CANB, NSW); Nourlangie Ranger Station, May 1980, *Craven 5668* (BRI, CANB, L, MEL); Head of Koolpin Creek, West Arnhem Land, May 1978, *Webb & Tracey 12926* (BRI, CANB). **Queensland.** COOK DISTRICT: Batavia Downs, 3.1 km east of the western boundary fence on the Mission River track, Oct 1989, *Neldner 2812 & Clarkson* (BRI); Magnificent Creek, 10.8 km E of Rutland Plains, May 1992, *Clarkson 9444 & Neldner* (BRI); Shelfa Crossing, Mitchell River, Alice Mitchell Rivers NP, 27 km NE of Kowanyama, Aug 1994, *Myles HUM1078 et al.* (BRI); Mungkan Kandju NP, 2.5 km SW of Jabaroo Outstation, Coen River, Nov 2008, *Forster PIF34605 & McDonald* (BRI); 13 km N of junction of Archer and Coen Rivers, Jun 1993, *Neldner 4073* (BRI); Archer Bend NP, 120 km WNW of Coen, Jun 1994, *Fell DGF4373 & Buck* (BRI); Archer River, Wenlock – Coen Road, Jul 1930, *Brass 19727* (BRI); Archer River, just upstream from the Peninsula Development Road, Apr 1991, *Clarkson 8965 & Neldner* (BRI).

Distribution and habitat: *Diospyros calycantha* occurs in north Queensland (Cape York Peninsula and the Torres Strait Islands), in the Northern Territory, mostly north of Katherine, and in the Kimberley, northern Western Australia (**Map 1**). It is found mostly in semi-deciduous notophyll vine forest and gallery forest. The species has also been recorded from Papua New Guinea.

Phenology: Flowers have been recorded from January to September, and fruit from March to October.

Notes: The syntypes for *Diospyros calycantha* in the Berlin herbarium were destroyed during World War 2. A neotype has therefore been selected.

2. *Diospyros hebecarpa* A.Cunn. ex Benth., *Fl. Austral.* 4: 286 (1868). **Type:** Queensland. [COOK DISTRICT:] Cape York, *s.dat.*, *W. Hill 127* (syn: K); Endeavour River, June 1819, *A. Cunningham 308* (syn: K; isosyn: BM); East Coast [Australia], in 1820, *A. Cunningham s.n.* (syn: BM).

Illustration: Cooper & Cooper (2004: 155).

Tree to 20 m. Twigs with a few sparse appressed hairs, glabrescent, soon glabrous. Leaves: petiole 2–7 mm long, glabrous; lamina broadly ovate, oblong, or elliptic, 5–13 cm long, 2.5–5.5 cm wide; base shortly attenuate; glands few or several, then not confined to basal half of lamina; margins flat; apex obtuse or scarcely

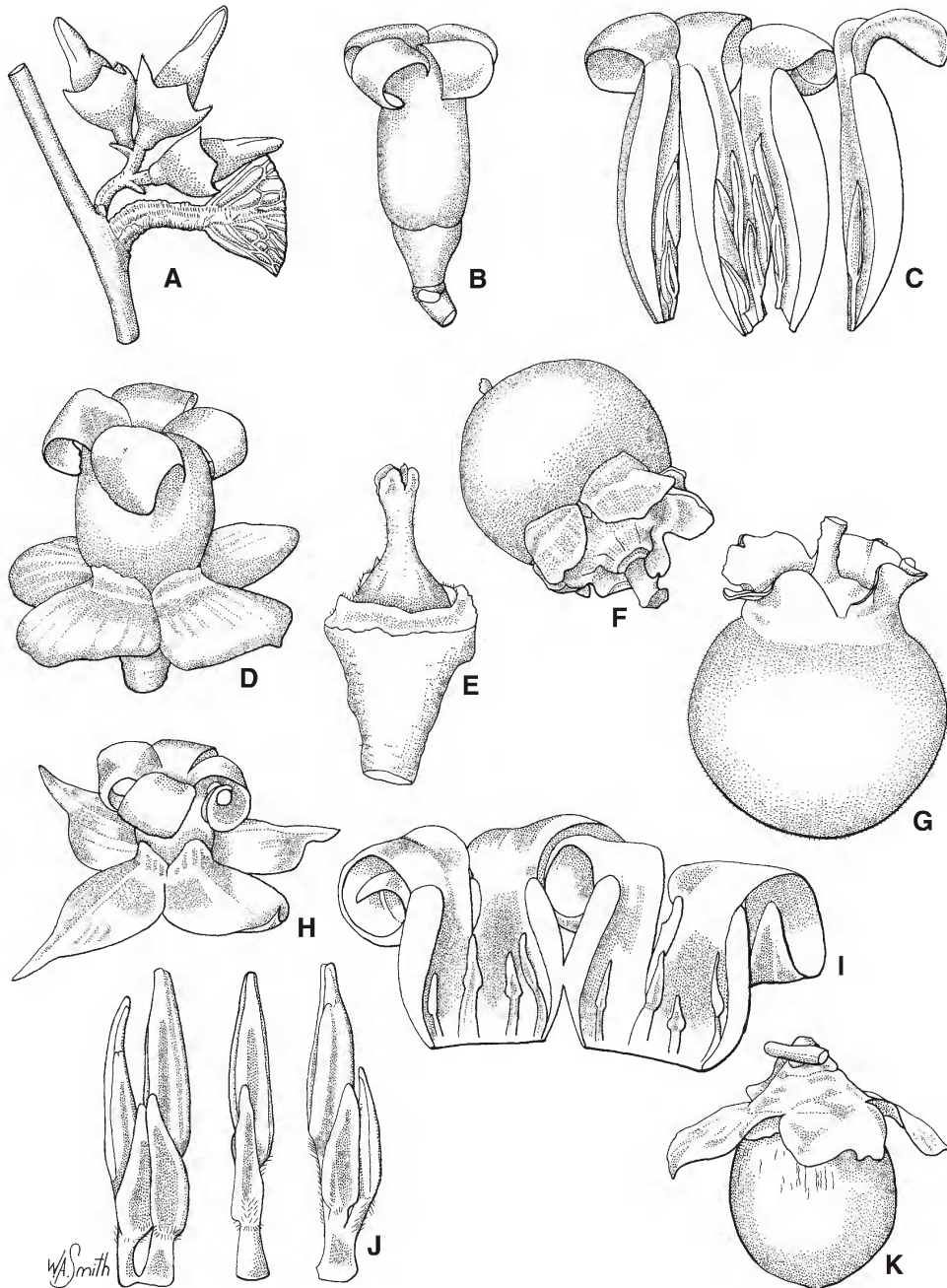


Fig. 1. A–F: *Diospyros calycantha*. A. male flower buds $\times 3$. B. male flower $\times 3$. C. dissected male petals showing stamens $\times 4$. D. female flower $\times 3$. E. dissected female flower showing ovary $\times 4$. F. fruit $\times 2$. **G**: *D. hebecarpa*. G. fruit $\times 1$. **H–K**: *D. uvida*. H. female flower $\times 2$. I. dissected female corolla $\times 4$. J. stamens from male flower $\times 8$. K. fruit $\times 1$. A from Russell-Smith 8169 & Lucas (BRI); B & C from Neldner 4073 (BRI); D & E from Russell-Smith 4601 (DNA); F from Clarkson 9444 & Neldner (BRI); G from Hyland 11211 (BRI); H & I from Jessup GJM379 et al. (BRI); J from Jago 7032 (BRI); K from Cooper WWC1895 (BRI).

acuminate; slightly discoloured and glabrescent to glabrous below; secondary veins 6–10 pairs, slightly raised above and below, basal pair of secondary veins sometimes longer and more acute than more distal veins, reticulate veins above and below slightly raised. **Male** inflorescence axes 3–11 mm long, with 3–10 flowers; pedicel hairs golden-brown. Calyx tube 3–3.5 mm long shallowly 4-lobed, lobes up to 0.5 mm long, acute, inside puberulous. Corolla tube 6–7 mm long, lobes 4, ovate to oblong; 2.5–3.5 mm long; outside appressed puberulous in middle of lobe with pale golden-brown hairs. Stamens 12–18, 3.5–6.5 mm long, glabrous or with a few hairs on the connective; filaments single or connate in pairs or threes and adnate to base of corolla tube, 1.5–4 mm long, glabrous; anthers linear, 2–3 mm long; pistillode 1–1.5 mm long, pubescent. **Female** flowers solitary, peduncle 4–6 mm long. Calyx tube 3.5–5 mm long; outside sparsely puberulous, inside sericeous, 4(–5)-lobed; lobes ovate, depressed ovate or elliptic-oblong, 7.5–8.5 mm long; 3–6 mm wide, spreading, glabrescent, apex acuminate, acute or obtuse. Corolla tube 5–6 mm long, glabrous inside, lobes 4, 5.5–6.5 mm long, apex acute, outside puberulous in middle of lobes. Staminodes 7 or 8. Ovary 3–4 mm long, densely pilose with erect hairs, 8-locular, ovules 1 per locule; style 2–3 mm long, pilose. Fruiting calyx tube cupular and appressed to base of fruit, 8–9 mm long, inside pubescent, lobes oblong, depressed ovate or broadly obovate, rounded or apiculate, reflexed, 7–10 mm long, 9–13 mm wide, margins recurved, glabrescent or glabrous. Fruit solitary, globose or depressed globose, 30–45 mm diameter, yellow, orange or red, pubescent with pale erect hairs; seeds 13–15 mm long. **Fig. 1G.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Dauan Island, Mt Cornwallis, Oct 1981, *Clarkson 3916* (BRI); Somerset, Cape York Peninsula, May 1962, *Webb & Tracey 6110* (BRI); 15 km from the main Bamaga to Jardine River Road on the track east to Ussher Point, Sep 1985, *Clarkson 6230* (BRI); Restoration Island, Aug 1965, *Gittins 1060* (BRI); NPR 8, Parish of Weymouth, Oct 1981, *Hyland 11211* (BRI); Jan 1982, *Hyland 11561* (BRI); Rocky River on eastern foothills of McIlwraith Range, Oct 1969, *Webb & Tracey 9469* (BRI); Hope Vale Mission Reserve, Aug 1978, *Kanis 1940* (BRI, L); Portion 5, Parish of Cook, 15° 32'S, 145° 13'E, Dec 1988, *Hyland 25647RFL* (BRI); SFR 310,

Goldsborough LA, Jul 1980, *Hyland 10541* (BRI), Oct 1998, *Hyland 16088* (BRI); SFR 933, Trinity, Little Pine LA, Dec 1989, *Hyland 25724RFL* (BRI). NORTH KENNEDY DISTRICT: Just S of Dittmer township, upper Kelsey Creek, WSW of Proserpine, Aug 1993, *McDonall 5568 & Bean* (BRI); Airlie Beach, Sep 1992, *Batianoff 9209302* (BRI); Conway NP, Mt Rooper walking track, Nov 1985, *Warrrian CW943* (BRI). SOUTH KENNEDY DISTRICT: R.60 Ossa, Cape Hillsborough, May 1975, *Hyland 4273RFL* (BRI); Hidden Valley Road, Cape Hillsborough, 10 km SE of Seaforth, Apr 1988, *Thompson 138* (BRI); Skull Knob, St Helens Beach, 10 km NE of Calen, Jul 1994, *Batianoff 94073 & Dillewaard* (BRI); NW section of Mt Beatrice, Eungella NP, *s. dat.*, *Pearson SP474* (BRI); Dolphin Heads, Mackay, Sep 1994, *Batianoff 94092 & Saltman* (BRI).

Distribution and habitat: *Diospyros hebecarpa* occurs in northern Queensland, from Torres Strait to Rollingstone, NW of Townsville, and from N of Proserpine to Mackay (**Map 2**). It also occurs in Papua New Guinea and many parts of Malesia. It is found in several types of vineforest.

Phenology: Flowers have been recorded from December to April, and fruit from June to December.

3. *Diospyros uvida* Jessup sp. nov.; resembling *D. hebecarpa*, but differing in having male flowers with 9 stamens and these with short appressed hairs on the free part of the filaments (12–18 stamens and glabrous filaments in *D. hebecarpa*); and female flowers with corolla lobes 9–10.5 mm long (5.5–6.5 mm long in *D. hebecarpa*), and fruit developing to 22–25 mm diameter and appressed pubescent (30–45 mm diameter and pubescent with erect hairs in *D. hebecarpa*) and with fruiting calyx lobes spreading and 12–14 mm long (reflexed and 7–10 mm long in *D. hebecarpa*). **Typus:** Queensland. COOK DISTRICT: Opposite Burton's dairy farm, end of Towalla Road, SE of Malanda, 29 October 2003, *A. Ford AF4188 & J. Holmes* (holo: BRI).

Diospyros sp. Swipers LA (B. Hyland 1984RFL); Queensland Herbarium database; Hyland *et al.* (2003).

Diospyros sp. (Swipers Flat); Cooper & Cooper (2004: 156).

Tree to 10 m, often flowering as a shrub. Twigs soon glabrous. Leaves: petiole 5–8 mm long, glabrous, lamina elliptic or oblanceolate, 6–12

mm long, 2.5–6.5 cm wide; base cuneate; glands few or if several, then not confined to basal half of lamina; margins flat; apex shortly and bluntly acuminate, glabrous both sides before full expansion; secondary veins mostly 5–9 pairs, slightly raised above and below, basal pair of secondary veins sometimes longer and more acute than more distal veins, reticulate veins above and below slightly raised. **Male** inflorescence axes 3–10 mm long, branched or not, few or multiple axes crowded in a leaf axil, with up to 6 flowers maturing together; pedicels with scattered pale brown hairs; calyx cupular to obconical, glabrescent, tube 2.5 mm long, inside sparsely puberulous, lobes 4, obtuse, 0.5–0.7 mm long. Corolla tube 7–7.5 mm long, lobes 4, oblong, 4.3–4.7 mm long, acute or obtuse, a few appressed hairs present in middle of lobe on outside, otherwise glabrous. Stamens 9 (2+2+3+2), 3.5–5 mm long, free part of filaments and base of anthers and connectives with short appressed hairs, basal part of filaments connate for about 1 mm, glabrous; anthers narrowly oblong or narrowly triangular, acute, connective not visible at the apex; pistillode c. 0.8 mm long, pubescent. **Female** flowers solitary, peduncle 2–4 mm long. Calyx tube 3.5–4 mm long, appressed puberulous outside and inside, 4-lobed, lobes broadly ovate or obovate, acuminate, 9–11 mm long, 6.5–8 mm wide, glabrescent or glabrous both surfaces. Corolla tube 4–5 mm long, glabrous inside, appressed puberulous towards lobes outside, lobes 4, narrowly ovate, 9–10.5 mm long, recurved at anthesis, apex acute, outside puberulous in middle of lobes. Staminodes 7 or 8. Ovary 3–4 mm long, densely appressed pubescent with white or pale brown hairs, 8-locular, ovules 1 per locule, style 2–2.5 mm long, pubescent. Fruiting calyx tube cupular and appressed to base of fruit, 5–8 mm long, inside pubescent, lobes broadly ovate, acuminate, spreading, 12–14 mm long, 10–15 mm wide, glabrescent or glabrous. Fruit solitary, subglobose, apiculate at style remnant, 22–25 mm diameter, sparsely appressed pubescent with white or pale brown hairs, glabrescent, reddish black; seeds 13–14 mm long. **Fig. 1H–K.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Eastern slope of Mt Sorrow, Feb 1993, *Weiblen 207* (BRI); Clacherty Road, c. 4.5 km NNE of Julatten, Oct 2007, *Jago 7032* (BRI); Foothills, Thornton Peak, Sep 1937, *Brass & White 301* (BRI); Baileys Creek, N of Daintree River, in 1962, *Webb & Tracey 6496* (BRI); Daintree River, Dec 1929, *Kajewski 1449* (BRI); Mossman River Gorge, Feb 1932, *Brass 2131* (BRI); Intake, Mossman, Sep 1948, *Smith 3970* (BRI); Rex Range, c. 2.8 km from Mossman – Julatten Road, c. 9 km NE of Julatten, Dec 1988, *Jessup 876 et al.* (BRI); Rex Range, Mar 1991, *Sankowsky 1252 & Sankowsky* (BRI); Formerly TR55, c. 300 m along snig track, near Whyanbeel, Sep 2000, *Ford AF2436* (BRI); Creek behind Karnak, tributary of Whyanbeel Creek, Daintree NP, Nov 1996, *Jago 4160* (BRI); SFR 310, Swipers LA, Oct 1968, *Hyland 1984RFK* (BRI) & *Hyland 1997* (BRI); Boonjee LA near Bartle Frere track, 0.8 km S Bobbin Bobbin Falls, 5.4 km NE Boonjee, Nov 1988, *Jessup GJM379 et al.* (BRI); SFR 194, c. 600 m NE of tower, Longlands Gap, off McKell Road, Jul 2001, *Ford AF2906* (BRI); Towalla Road, Topaz, Aug 2004, *Cooper WWC1895* (BRI).

Distribution and habitat: *Diospyros uvida* occurs in north east Queensland from Mt Sorrow near Cape Tribulation to near Julatten and also in Wooroonooran NP and adjacent areas on the Atherton Tableland (**Map 3**) mostly in mesophyll vine forest.

Phenology: Flowers have been recorded from October to December, and fruit from January to August.

Etymology: The species epithet is from Latin *uvidus* meaning wet and humid and refers to the Wet Tropics rainforest habitat where the species grows.

4. *Diospyros rugosula* R.Br., *Prodr.* 526 (1810). **Type: [Northern Territory] Carpentaria, Groote Eylandt, 15 January 1803, *R. Brown iter Austral.* 2827 (holo: BM; iso: K).**

Diospyros rugulosa R.Br. (*orthogr. error*) in A.DC., *Prodr.* 8: 229 (1844).

Diospyros bundeyana Kosterm., *Blumea* 23: 454 (1977). **Type:** Northern Territory. W. Arnhem land, Mt Bundey, 21 July 1971, *M.M. van Balgooy & N. Byrnes 1284* (holo: L).

Diospyros cordifolia auct. non Roxb.; Bentham (1868: 286).

Diospyros montana auct. non Roxb.;
Bakhuizen van den Brink (1936: 265–270).

Deciduous shrub or tree to 7 m. Twigs pubescent with pale brown hairs, glabrescent. Leaves: petiole 2–6.5 mm long; channelled above, pubescent; lamina chartaceous, elliptic, obovate, or ovate, 2–9(–14) cm long, 2–4(–5.5) cm wide; base cuneate; glands sparse; margins flat or undulate; apex obtuse, acute or acuminate; pubescent with erect curved hairs, glabrescent; secondary veins 4–5 pairs. **Male** inflorescence axes up to 1 cm long; bracteate, mostly 2 or 3 flowered; peduncle, pedicel and outside of calyx pubescent with erect hairs; calyx tube 1–1.5 mm long, lobes 4, ovate, *c.* 2 mm long, inside glabrous. Corolla contorted; lobes 4; oblong to ovate; 5–6 mm long; tube 2–2.5 mm long, outside glabrous except a few hairs on margin. Stamens (14–)16, subequal, 4–5 mm long; filaments adnate to corolla tube in pairs one above the other or shortly connate, 0.3–0.8 mm long, glabrous; anthers narrowly oblong-lanceolate, acute, 2.5–3.2 mm long, with scattered short hairs; pistillode subglobular, less than 1 mm, glabrous. **Female** flowers solitary, peduncle 3.5–5 mm long, bearing 2 foliaceous bracts. Calyx 4-lobed; 5.5–7 mm long, tube 2–2.5 mm long, lobes broadly ovate or suborbicular, 3.5–5 mm long; outside and inside pubescent. Corolla urceolate, contorted, tube 2.5–3 mm long, lobes 4, ovate, obtuse, 4.2–4.8 mm long, ciliate on apical margin, otherwise glabrous. Staminodes 4. Ovary pyramidal and shallowly lobed, 3–3.5 mm long; glabrous; 8-locular; with 1 ovule per locule; styles 4, connate only at base, *c.* 1.5 mm long, bifurcating at the stigmatic apex and with scattered erect hairs. Fruiting calyx tube up to 3 mm long, lobes reflexed, oblong or narrowly ovate, 6–9 mm long. Fruit globose or subglobose; 17–25 mm long, 25–30 mm wide, glabrous, 2–8-seeded; seeds segment-shaped, rugulose, up to 15 mm long. **Fig. 2A–G.**

Additional selected specimens examined: **Western Australia.** Karrakatta Bay, E of Cape Leveque, Dampier Peninsula, SW Kimberley Coast, Jun 1982, *Kenneally* 8534 (PERTH); Port Warrender, N. Kimberley, Jun 1974, *Beard* 7032 (PERTH); Walsh Point on W side of Port Warrender off Admiralty Gulf, Jun 1985, *Fryxell et al.* 4756 (CANB). **Northern Territory.** Port Darwin, in 1883, *Holtz* 378 (MEL); Port Darwin, in 1884, *Holtz*

435 (MEL); Inverell Bay, 6 km W of Nhulunbuy, Nov 1989, *Forster PIF5955* (BRI, MEL); Flinders Peninsula, Dec 1987, *Dunlop* 7446 (BRI); Gunn Point, Nov 1989, *Forster PIF5923 & Russell-Smith* (BRI); Mission Hole, Elizabeth Downs Station, May 1984, *Rankin* 2906 (BRI); 10 km S Cannon Hill, Nov 1983, *Russell-Smith* 840 (BRI); Mataranka Falls, Roper River, Oct 1988, *Russell-Smith* 6195 & *Lucas* (BRI); Wagait Road, 10 km N of Finnis River Crossing, Oct 1984, *Wightman* 1679 (BRI); East Alligator River, 1 mile [1.6 km] E of crossing, Jul 1972, *Byrnes* 2721 (CANB, K); Victoria River, Dec 1855, *Mueller s.n.* (MEL); 10 km SW of Timber Creek township, Victoria River Region, May 1990, *Menkhorst* 1023 (MEL); 40 km NE from Numbulwar, Nov 1987, *Russell-Smith* 4239 & *Lucas* (BRI); 16 Mile Caves Reserve, Katherine, Oct 1977, *Parker* 1152 (CANB); Towercast Area, 16 Mile Caves Reserve south of Katherine, May 1978, *Webb & Tracey* 12300 (BRI); 8 km WSW of Borroloola, May 1987, *Latz* 10440 (BRI); Carpentaria Hwy 15 km from Daly Waters, Apr 1993, *Egan* 2061 (BRI); Fitzgerald Range 11 km N of Victoria River Downs Station, Mar 1989, *Russell-Smith* 7640 & *Lucas* (BRI).

Distribution and habitat: *Diospyros rugosula* occurs from Cape Leveque to the Anjo Peninsula, northern Western Australia and is scattered throughout the Northern Territory, north of around 16°20'S latitude (**Map 3**). It is found in monsoon forest, semi-deciduous microphyll or notophyll vine thicket, fringing mangroves or in the vicinity of waterways. It probably also occurs in Timor and Indonesia.

Phenology: Flowers have been recorded from October to December, and fruit from October to June.

Notes: This species was combined with *Diospyros cordifolia* Roxb. by Bentham (1868) and also with *D. montana* Roxb. by Bakhuizen van den Brink (1936) but was described as a distinct species by Kostermans (1977) who compared it with *D. cordifolia* and was apparently unaware of Brown's name for the same taxon (Brown 1810). In *D. montana* and *D. cordifolia* the stamen filaments are connate forming a common filament 1–2 mm long whereas in *D. rugosula* there is practically no common filament, the stamens attach to the corolla tube one above the other. The pistillode is globular and slightly lobed and lacks the apical style remnants found in *D. montana* and *D. cordifolia*. It shares the same number of staminodes (4) in the female flower as *D. montana* whereas in *D. cordifolia* there are 8–12 staminodes. The calyx is smaller and

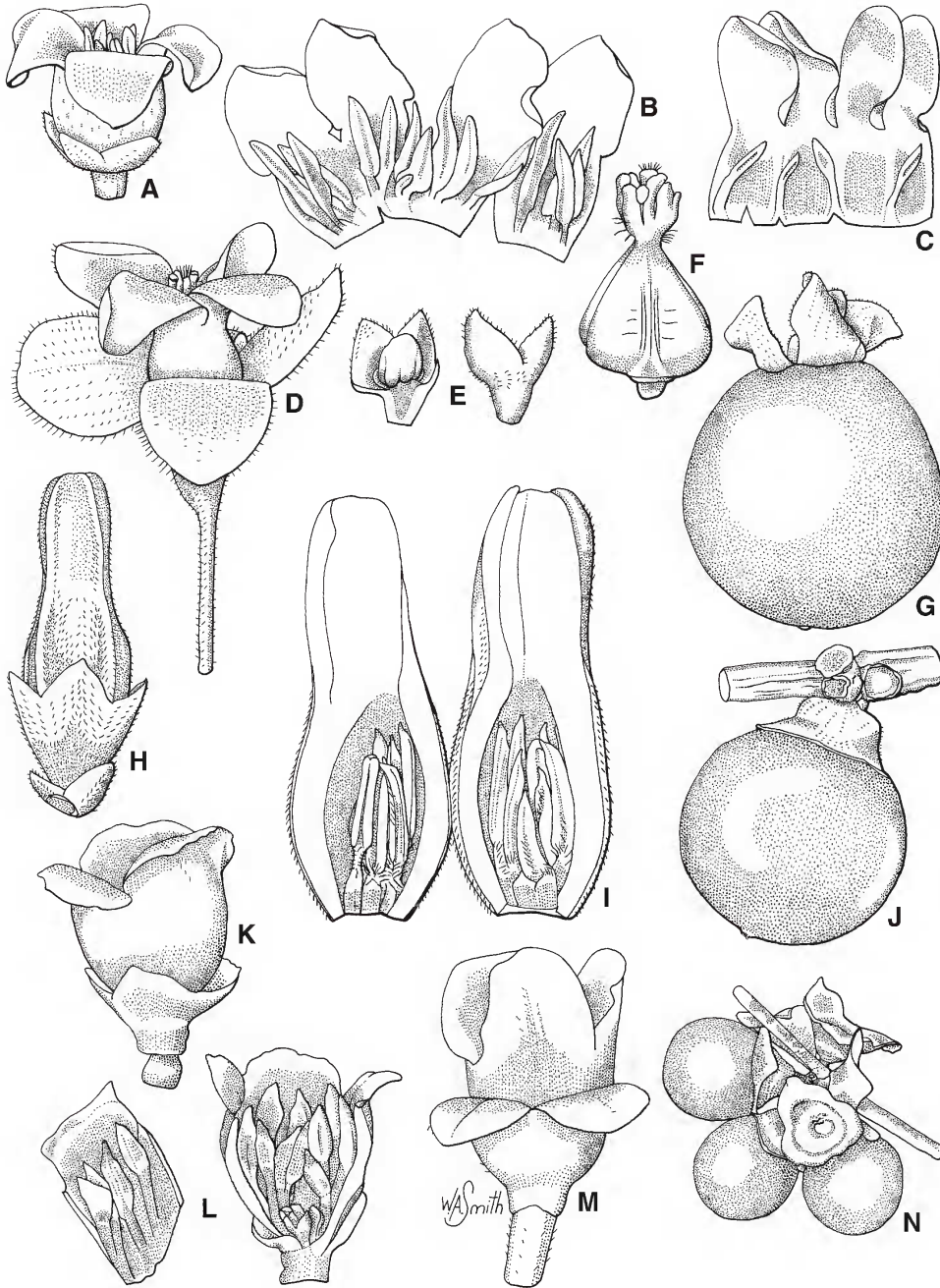


Fig. 2. A–G: *Diospyros rugosula*. A. male flower $\times 4$. B. dissected male corolla showing stamens $\times 4$. C. dissected female corolla showing staminodes $\times 4$. D. female flower $\times 4$. E. dissected male hypanthium showing pistillode $\times 4$. F. dissected ovary $\times 6$. G. fruit $\times 1.5$. H–J: *D. maritima*. H. male flower bud $\times 4$; I. dissected male corolla showing stamens $\times 6$; J. fruit $\times 1.5$. K–N: *D. fasciculosa*. K. male flower $\times 8$. L. dissected male flower showing stamens and pistillode $\times 8$. M. female flower $\times 6$. N. infructescence $\times 1$. A, B, E from Russell-Smith 840 (BRI); C, D, F from Forster PIF5923 & Russell-Smith (BRI); G from Webb & Tracey 12300 (BRI); H & I from Martin 90 (BRI); J from Weber 10006 (BRI); K & L from Fell DGF3396 et al. (BRI); M from Brass 19969 (BRI); N from Fell DGF3995 et al. (BRI).

less deeply lobed than in these two species and the styles have scattered erect hairs (glabrous in *D. montana* and *D. cordifolia*).

5. *Diospyros maritima* Blume, *Bijdr. Fl. Ned. Ind.* 669 (1826). **Type citation:** “ad littora australie Javae insulae”. **Type:** possible type at P, online image!

Cargillia laxa R.Br., *Prodr.* 526 (1810); *Diospyros laxa* (R.Br.) F.M.Bailey, *Syn. Queensl. Fl.* 299 (1883), *nom. illegit. non* Teijsm. & Binnend. (1855). **Type:** Northern Territory. Gulf of Carpentaria opposite Groote Eylandt, 10 February 1803, *R. Brown iter Austral.* 2829 (holo: BM; iso: K).

Cargillia megalocarpa F.Muell., *Fragm.* 5: 163 (1866). **Type:** Northern Territory. Escape Cliffs, Arnhem Land, in Nov/Dec 1865, *John McKinlay & Charles Hulls s.n.* (syn: MEL 232960 & 232961).

Diospyros nitens W.Fitzg., *The Western Mail* 21 (1066) 10 (2 Jun. 1906), *nom. inval.*, *J. Proc. Roy. Soc. Western Australia* 3: 192 (1918). **Type:** [Western Australia.] Devils Pass, Napier Ranges, May 1905, *W.V. Fitzgerald 614* (syn: PERTH 01598880); Synnott Range near Sprigg River, August 1905, *W.V. Fitzgerald 1321* (syn: PERTH 02890143 & 02890151; isosyn: NSW926658, online image!).

Tree to 25 m. Twigs with appressed hairs, glabrescent. Leaves: petiole 5–14 mm long; lamina coriaceous, oblong to ovate, elliptic or lanceolate, 5.5–30 cm long, 2–12 cm wide; base cuneate or rounded; 1 or sometimes 2 glands on each side of midvein at base of lamina; margins often recurved; apex obtuse or rounded; glabrescent to nearly glabrous; midvein depressed above, secondary veins 7–15 pairs. **Male** inflorescence axes up to 2 mm long with 3–8 flowers; calyx mostly 4-lobed, appressed pubescent, tube 2.5–3 mm long, lobes 1–1.5 mm long, glands sometimes present. Corolla appressed pubescent or sericeous outside, glabrous inside, tube 5.5–6.5 mm long, lobes 4, 4.5–6 mm long. Stamens 16–18(–20), 3–5 mm long, in two whorls, filaments 1–1.5 mm long, connate in pairs and adnate to the tube, pubescent near anther; anthers linear, 1.8–2.6 mm long,

connectives usually with some appressed hairs. **Female** flowers solitary, peduncle *c.* 2 mm long, calyx tube 3–5 mm long; lobes 4, 2–2.5 mm long, acute, appressed pubescent outside, densely sericeous inside. Corolla tube 5–7 mm long, lobes 4, ovate-oblong, acute or acuminate, 6–9 mm long, 3–5 mm wide, staminodes 4–10, 3.5 mm long. Ovary ovoid, ferruginous pubescent, 3–4 mm diameter, 8-locular, locules uniovulate, style 2–4 mm long, puberulous, stigmas lobed. Fruiting calyx patelliform, appressed to base of fruit. Fruit depressed globose, 15–20 mm long, 20–30 mm wide, glabrescent, black, 1–6-seeded; seeds 8–10 mm long. **Fig. 2H–J.**

Additional selected specimens examined: Western Australia. Chimney Rocks, (Emerian Point), NE of Dampierland, Feb 1986, *Martin 90* (BRI); *loc. cit.*, Mar 1986, *Martin 91* (BRI); Surveyors Creek Road turnoff between Mitchell Plateau mining camp and Point Warrender Road, May 1981, *Tracey 15115* (BRI); Neville Creek, off Calder River, Eastern Walcott Inlet, May 1983, *Milewski 174* (BRI); Harding Range N of Eastern Walcott Inlet, May 1983, *Fell 40* (BRI); Hidden Island, Buccaneer Archipelago, Jun 1982, *Kenneally 8403* (BRI); Carson Escarpment; gully below Wonjarring Falls, 4 km NNE of Face Point adjacent Drysdale River NP boundary, Jun 1984, *Forbes 2314* (BRI). **Northern Territory.** Cape Hotham, 1.5 km S, Jun 1988, *Russell-Smith 5446 & Lucas* (BRI); West Alligator Head, Jun 1988, *Russell-Smith 5622 & Lucas* (BRI); New Year Island, Jul 1992, *Leach 3132* (BRI); 5 km SSE of De Courcy Head at Arafura Sea, May 1988, *Mumir 6052* (BRI); Arnhem Land, *c.* 15 km SE from Cape Cockburn, Jun 1988, *Weber 10006* (BRI); Banjo Beach, Melville Island, Jan 1966, *Stocker GS35* (BRI); Warangaya, Elcho Island, Sep 1987, *Russell-Smith 3273 & Lucas* (BRI); Wessel Islands, Sep 1972, *Latz 3259* (BRI); Groote Eylandt, Bartalumba Bay, Jul 1972, *Dunlop 2640* (CANB). **Queensland.** COOK DISTRICT: Perry Island, Feb 1991, *Card PER11* (BRI); Evans Bay, 26 km NE of Bamaga, Feb 1994, *Fell DGF3906 et al.* (BRI); McIvor River Crossing, Cooktown – Starke Road, *Tracey 14437* (BRI); Stephens Island, slope east of beach; east of Cowley Beach, Sep 2010, *Ford AF5773 & Bradford* (BRI).

Distribution and habitat: *Diospyros maritima* occurs from near Derby, northern Western Australia, to Groote Eylandt, Northern Territory, and from northwest Cape York Peninsula and Torres Strait to near Cowley Beach, northeast Queensland (**Map 4**). It also occurs in Indonesia, Timor and Papua New Guinea. The species is found in coastal and subcoastal vineforest, near mangroves and on coral cays.

Phenology: Flowers have been recorded in January and February, and fruit from March to November.

6. Diospyros fasciculosa (F.Muell.) F.Muell., *Austral. Veg.* 35 (1866); *Maba fasciculosa* F.Muell., *Fragm.* 5: 163 (1866); *Ebenus fasciculosa* (F.Muell.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891). **Type:** [Queensland. MORETON DISTRICT:] Brisbane River, December 1856, *F. Mueller s.n.* (lecto [here designated]: MEL 92392).

Maba laxiflora Benth., *Fl. Austral.* 4: 290 (1868). **Type:** Queensland. [PORT CURTIS DISTRICT:] Rockhampton, *s.dat.*, *P. O'Shanesy* 277 (holo: MEL 92396).

Maba ruminata Hiern, *Trans. Cambridge Philos. Soc.* 12: 135 (1873). **Type:** New Caledonia, in 1861, *J.F. Deplanche* 311 (holo: P, online image!).

Diospyros sp. (Claudie River D.G.Fell DGF3042); Jessup (1997, 2002, 2007, 2010).

Tree to 20 m. Twigs glabrescent or glabrous. Leaves: petiole 6–10 mm long; ± flat above, glabrous; lamina elliptic, ovate or oblanceolate, 6–19 cm long, 2.5–7 cm wide; base cuneate; glands less than 0.5 mm across, sparsely scattered; margins recurved; tip acute, acuminate or rounded; above and below glabrous; midvein on upper surface flush, raised, or depressed, secondary veins 6–10 pairs, above and below slightly raised, tertiary veins above and below slightly raised, flush or indistinct, above sparsely reticulate, or reticulation obscure. **Male** inflorescence axes usually 3–12 in axillary fascicles, each axis branched with mostly 3–10 flowers, appressed puberulous, glabrescent. Calyx shallowly 3 or 4-lobed, 1.2–1.5 mm long, glabrescent. Corolla campanulate, tube 2–2.5 mm long, glabrous, lobes 3 or 4, semicircular or depressed obovate, 1.5–2 mm long. Stamens 8–16(–20); 1.8–2.5 mm long; filaments connate at base in pairs and adnate to tube at base, 1–1.2 mm long, puberulous with erect or antrorse hairs; anthers narrowly ovate, 1.2–1.5 mm long, connective glabrous or with a few hairs; pistillode 0.5–0.75 mm long, glabrous. **Female** flowers 3–10 in a

fascicle, 5–10 mm long; pedicel 1.75–4 mm long. Calyx 3 or 4-lobed; lobes 2–2.5 mm long; tip rounded; tube 1.2–1.5 mm long; outside puberulous; inside glabrous. Corolla lobes 3 or 4, rounded, 2.5–3 mm long with a median line of hairs; tube 2–2.5 mm long. Staminodes 0–4. Ovary 2–3 mm long, glabrous, 6-locular with 1 ovule per locule, tapering to connate styles and 2 or 3 shortly lobed stigmas. Fruiting calyx tube cupular and appressed to base of fruit, 5–7 mm long, lobes spreading or reflexed, 4–6 mm long. Fruit broadly ellipsoid or subglobose; 13–15 mm long, 10–15 mm wide, apex and base rounded, glabrous, 4–6-seeded; seeds 10–11 mm long. **Fig. 2K–N.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Frangipani Beach Scrub, 0.7 km S of Cape York, 26.4 km NE of Bamaga, Feb 1994, *Fell DGF3995 et al.* (BRI); Stony Point N of Pascoe River, Cape York Peninsula, Nov 1977, *Webb & Tracey* 13857 (BRI); Turrel Hill, 10 km WSW of Nesbit River mouth, 51.6 km N of Silver Plains Homestead, Cape York Peninsula, Aug 1993, *Fell DGF3396 et al.* (BRI); Nesbit River, Sep 1973, *Hyland* 6831 (BRI); Bonanza Creek, Peach River, Aug 1948, *Brass* 19969 (BRI); Mt Stuckey Area NW Starcke Station, Sep 1974, *Tracey* 14292 (BRI). NORTH KENNEDY DISTRICT: SE foothills of Mt Dryander, Mar 1969, *Smith s.n.* (BRI [AQ410106]); Adjacent to Impulse Creek, Apr 1999, *McDonald* 6683 & *Squires* (BRI). PORT CURTIS DISTRICT: Olsens Capricorn Caverns, The Caves, Mar 1988, *Vavryn* 60 (BRI); Curtis Island, Dec 1984, *Gibson* 685 (BRI); Essendean Bridge, crossing of Baffle Creek, between Berajondo and Agnes Water, Jan 2008, *Forster PIF33230 et al.* (BRI); SF 53, Dan Dan Scrub, Dec 1987, *Gibson* 985 (BRI). BURNETT DISTRICT: Coongara Rock, 11 km SE of Coalstoun Lakes, SF 1344, Nov 2002, *Forster PIF29110* (BRI). WIDE BAY DISTRICT: Dundowran Beach, Apr 2003, *Sankowsky* 1994 & *Sankowsky* (BRI); Mt Walsh NP, Palm Valley, Coast Range, Nov 2008, *Forster PIF34508* (BRI); Tinana Creek, 7 km ENE of Tiaro, Jan 2005, *Forster PIF30537 et al.* (BRI). MORETON DISTRICT: Mt Eerwah, 4 km W of Eumundi, Sep 1984, *Sharpe* 3578 (BRI, NSW); S of Summit, Little Mt Brisbane, Nov 1984, *Guymer* 1903 & *Dillewaard* (BRI); Moggill FR, Nov 2005, *Halford* Q8626 *et al.* (BRI). **New South Wales.** NORTH COAST: Woody Head, 3 miles [4.8 km] N of Iluka, Nov 1966, *McGillivray* 2673 *et al.* (BRI, NSW).

Distribution and habitat: *Diospyros fasciculosa* occurs on eastern Cape York Peninsula north of Starcke NP, and from Mt Dryander, central Queensland to Iluka, northeast New South Wales (**Map 4**). It also occurs in New Caledonia, Fiji and Eastern Java. The species is commonly found in riverine,

coastal and other types of lowland notophyll vineforest.

Phenology: Flowers have been recorded from August to December and fruit from November to July.

Notes: Singh (2005) nominated the Mueller collection at MEL as lectotype. However, there is no evidence that he saw any of the syntypes in MEL and as the Mueller collection from the Brisbane River is mounted on two sheets MEL 92392 and MEL 92394, with two separate labels, I have chosen the former as a subsequent lectotypification as allowed under Art. 9.17 of the International Code of Nomenclature (Melbourne Code).

7. **Diospyros kaki* Thunberg, *Nova Acta Regiae Soc. Sci. Upsal.* 3: 208 (1780). **Type:** not designated.

Tree to 6 m, deciduous. Twigs pubescent or nearly glabrous. Leaves: petiole 10–25 mm long; lamina broadly elliptic to suborbicular or ovate, 5–12 cm long, 2.5–10 cm wide; base cuneate to rounded or shortly decurrent; glands scattered along length of lamina, sometimes few or absent; margins flat; apex obtuse to shortly acuminate; pubescent below, mostly on main veins, midvein pubescent above; midvein depressed above, secondary veins 5–7 pairs. **Male** inflorescence axes 5–8 mm long; in 3–5-flowered cymes. Calyx tube 1.2–1.5 mm long, lobes 4, 4.5–5 mm long, 3–4 mm wide, pubescent outside and inside; corolla tube urceolate, 6–7 mm long, lobes 4, ovate, recurved, 3–4 mm long, glabrous or with a ciliate margin. Stamens 14–24, filaments connate at base and adnate to base of corolla tube, 1–1.5 mm long; anthers oblong, 4–5 mm long, top of filaments and connectives appressed pubescent; pistillode disc-like, 0.7 mm diameter, glabrous. **Female** flowers solitary, pedicel 10–12 mm long. Calyx 4-lobed, tube 4–5 mm long lobes 10–13 mm long, acute, pubescent both sides, glabrescent; corolla 10–15 mm long, 4-lobed, lobes ovate, recurved, 4.5–5 mm long. Staminodes 8–16. Ovary 3–5 mm long, sericeous or glabrous, 8-locular with 1 ovule per locule, style 4-fid, 3–4 mm long, stigmas 2-fid. Fruiting calyx reflexed, 30–40 mm diameter. Fruit depressed

globose to broadly ovoid, 30–40 mm long, 20–85 mm wide, glabrous or nearly so, yellow to orange; seeds 18–25 mm long.

Selected specimens examined: Queensland. WIDE BAY DISTRICT: Glenbar Road, SF 57 St Mary's, c. 18 km W of Tiaro, Aug 2003, *Watts s.n.* (BRI [AQ762450]). MORETON DISTRICT: Yandina Creek, 2.5 km E of Valdora and c. 6 km NE of Yandina on Yandina Creek Road, *Sharpe 4530* (BRI); SF E of Clear Mountain Road, Cashmere; tributary of Four Mile Creek, Apr 2011, *Phillips 2153 & Phillips* (BRI); Brisbane Valley Rail Trail: Mt Hallen – Esk Section, Mar 2012, *Phillips 2247 & Phillips* (BRI); Kobble Creek (most northerly branch), Dec 2008, *Phillips 1898 & Phillips* (BRI); Paradise Road, Pallara, c. 15 km S of Brisbane GPO, Nov 2003, *Bean 21147* (BRI).

Distribution and habitat: *Diospyros kaki* is native to China and possibly Japan and is widely cultivated for its edible fruit. It is naturalised in southeast Queensland, from near Tiaro to south of Brisbane (**Map 5**). Clumps of trees sometimes persist in abandoned gardens.

Phenology: Flowers have been recorded in October and fruit in March.

8. *Diospyros compacta* (R.Br.) Kosterm., *Blumea* 23: 454 (1977); *Maba compacta* R.Br., *Prodr.* 528 (1810); *Ebenus compacta* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891); *Diospyros ferrea* var. *compacta* (R.Br.) Fosb., *Brittonia* 40: 61 (1988). **Type:** [Northern Territory.] North Coast Island y2 [Pobassoo Island], 18 February 1803, *R. Brown iter Austral.* 2830 (holo: BM; iso: K).

Maba reticulata R.Br., *Prodr.* 528 (1810); *Ebenus reticulata* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891), *non Diospyros reticulata* Willd. (1805); *Diospyros ferrea* var. *reticulata* (R.Br.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 58, 64 (1937). **Type:** [Queensland. Cook DISTRICT:] Prince of Wales Island e [Good's Island], 2 November 1802, *R. Brown iter Austral.* 2831 (holo: BM; iso: K).

Maba interstans F.Muell., *Fragm.* 5: 163 (1866). **Type citation:** “Ad sinum Rockingham Bay, *Dallachy*”, *vide* Bentham (1868: 291). **Type:** not located.

Diospyros sp. (Mt White P.I. Forster PIF14415); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Mt White); Cooper & Cooper (2004: 156).

Illustration: Cooper & Cooper (2004: 154).

Shrub or tree to 15 m. Twigs usually with erect hairs *c.* 0.1 mm long and appressed submedifixed hairs 0.3–0.4 mm long, glabrescent. Leaves: petiole (1.7–) 3–5(–8) mm long, flat above, with similar indumentum to twigs. Lamina often coriaceous, obovate, oblong, or elliptic, (1.5–) 3–8 (–12) cm long, (0.8–) 2–4 (–8.5) cm wide; base cuneate; glands 1–4 mostly in basal half, or absent from some leaves; margins slightly to strongly recurved; apex rounded, obtuse or emarginate; glabrescent or soon glabrous; midvein depressed above, secondary veins 4–7 pairs, raised above, sometimes difficult to distinguish from higher order veins, reticulate veins raised above on dried material. Male inflorescence axes up to 3 mm long with (1–)3(–5) flowers, puberulous. Male flower pedicel to 0.5 mm long, puberulous with grey or pale brown hairs. Flower 3.5–4 mm long. Calyx tube 1.5–2.5 mm long, lobes 3(–4), 1–2 mm long, sparsely puberulous, glabrescent outside, glabrous or with a few hairs inside, tip rounded, or obtuse. Corolla tube 2.4–4 mm long, lobes 3, contorted, broadly ovate, 1–1.5 mm long, upper part of tube and lobes appressed pubescent outside, the hairs shorter where the lobes overlap in bud, glabrous inside. Stamens (4–) 6–9, solitary or up to 3 singles alternating with up to 3 pairs, the filaments of a pair connate only at base; filaments not adnate to the corolla tube, 1.2–1.5 mm long, glabrous; anthers linear to lanceolate, 1.5–2 mm long; pistillode up to 1.5 mm long, pubescent. Female flowers mostly solitary; peduncle 0.5–2 mm long, calyx 3(–4)-lobed, tube to 1 mm long, lobes obtuse or rounded, 1–1.5 mm long, sparsely puberulous, glabrescent outside, sericeous inside. Corolla tube 2–4 mm long, sericeous outside, glabrous inside, lobes 3 or 4, broadly ovate, rounded, 1.5–2 mm long, sericeous outside, glabrous inside. Staminodes absent. Ovary 2.5–2.8 mm long, sericeous, 3-locular; ovules 2 per locule; style 0.3–0.5 mm long; pubescent, stigmas shortly lobed. Fruiting calyx recurved or spreading, lobes rounded or indistinct. Fruit solitary, globose or depressed globose, 9–14 mm long, 12–14 mm wide, soon

becoming glabrous, 1–4-seeded; seeds 5–6.5 mm long. **Fig. 3A–G.**

Additional selected specimens examined: **Northern Territory.** Woolanang – Channel Point Road, N of Daly River, May 1978, *Webb & Tracey 12732* (BRI); NE coast of Cape Van Diemen, Melville Island, May 1978, *Webb & Tracey 12730* (BRI); Darwin River, Nov 1974, *Parker 560* (BRI); Darwin, Oct 1946, *Blake 17325* (BRI); Point Stewart, Oct 1983, *Russell-Smith 813* (BRI); Black Jungle, Nov 1982, *Wightman 302 & Dunlop* (BRI, CANB, MEL, NSW); Black Jungle, Feb 1986, *Wightman 2552 & Clark* (BRI, CANB); Cobourg Peninsula, Wurgurlu Bay, Oct 1987, *Russell-Smith 3659 & Lucas* (BRI); Gove, Cape Wirawawoi, Feb 1998, *Wightman 4110* (BRI); Mouth of Angurugu River, Groote Eylandt, Mar 1988, *Russell-Smith 5162 & Lucas* (BRI); Koolatong River, at junction with Maidjung River, Oct 1996, *Cowie 7370* (BRI). **Queensland.** COOK DISTRICT: Boydong Island, Dec 1987, *Clarkson 7437* (BRI); Stoney Point, N of Pascoe River, Cape York Peninsula, Nov 1977, *Webb & Tracey 13859* (BRI); TR 14, Sep 1975, *Hyland 3290RFK* (BRI, NSW); Mt White, Coen, Dec 1993, *Forster PIF14415* (BRI); Youngmans Crossing, Pascoe River, Nov 1977, *Tracey 14170* (BRI); Palfrey Island, near Lizard Island, Oct 1988, *Batianoff 10305* (BRI); Cook's Lookout, Lizard Island, Sep 1988, *Batianoff 10214* (BRI); Green Island, Coral Cay, E of Cairns, Aug 1993, *Jago 3016* (BRI). NORTH KENNEDY DISTRICT: Conway NP, Shute Harbour, about 35 km NE of Proserpine, Nov 1985, *Sharpe 4135* (BRI); Track to Swamp Bay, Conway Range NP, about 25 km NE of Proserpine, Nov 1985, *Sharpe 4108* (BRI). SOUTH KENNEDY DISTRICT: Turtle Bay, Carlisle Island, 35 km N [of] Mackay, Sep 1986, *Sharpe 4391 & Batianoff* (BRI); Mt Bassett, Mackay, Mar 1993, *Batianoff 9303439 et al.* (BRI). PORT CURTIS DISTRICT: Near homestead, Middle Percy Island, Nov 1989, *Batianoff 11798 et al.* (BRI).

Distribution and habitat: *Diospyros compacta* occurs in the Northern Territory from the Daly River to Groote Eylandt and in Queensland from Torres Strait and Cape York Peninsula to Middle Percy Island, central coastal Queensland (**Map 5**). It is found in semi-deciduous vine thicket and riparian forest, frequently on coastal sands and near mangroves.

Phenology: Flowers have been recorded from August to November and fruit from November to March.

Notes: Specimens with very narrow oblong leaves with strongly recurved margins are found in the deciduous vine thickets of Cape York Peninsula and in coastal areas exposed to wind shearing. These were placed in BRI under *Diospyros* sp. (Mt White P.I. Forster PIF14415). This variation probably contributed

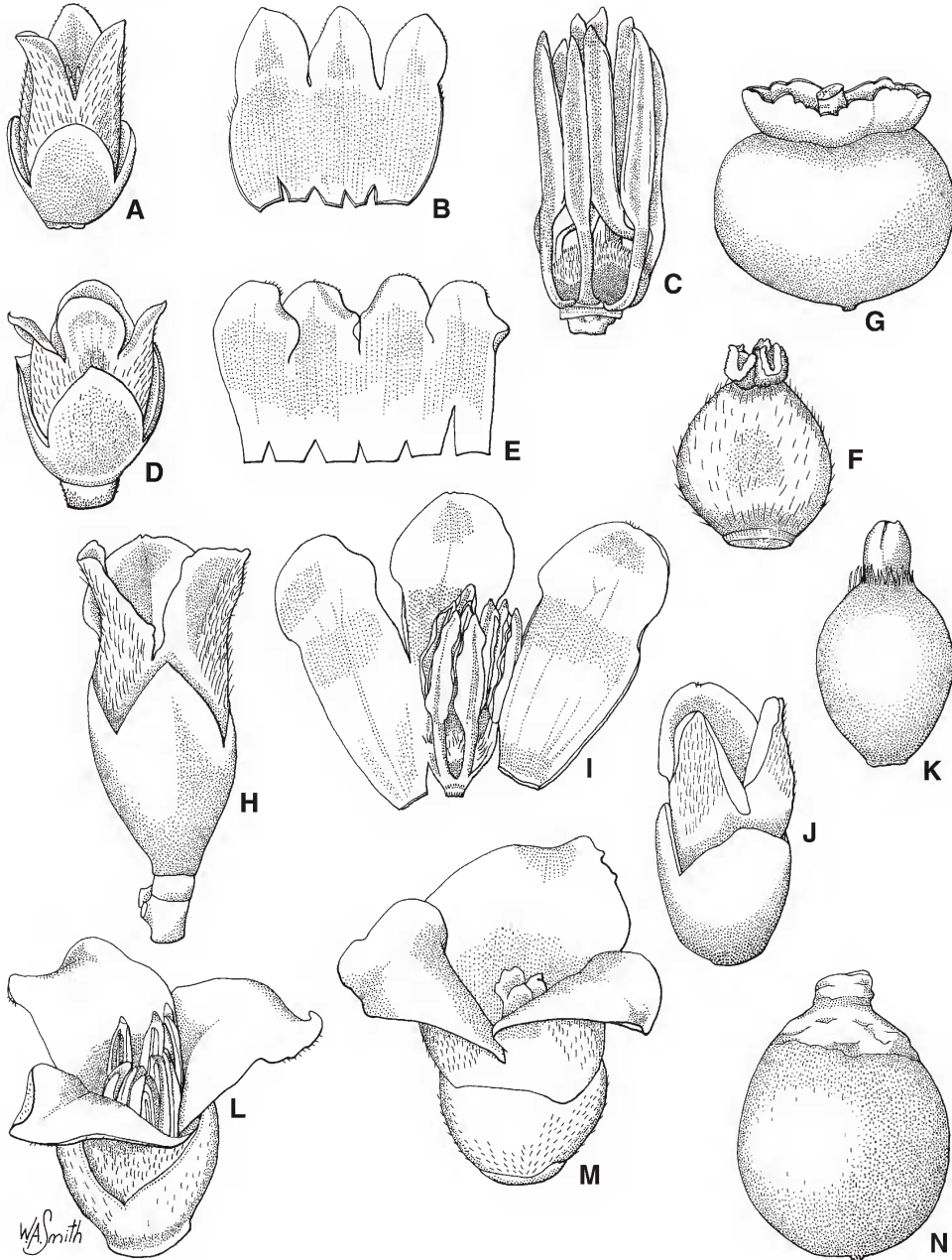


Fig. 3. A–G: *Diospyros compacta*. A. male flower $\times 4$. B. dissected corolla, male flower $\times 4$. C. dissected stamens and pistillode, male flower $\times 8$. D. female flower $\times 4$. E. dissected corolla, female flower $\times 4$. F. dissected ovary, female flower $\times 8$. G. fruit $\times 3$. **H–K: *D. humilis*.** H. male flower $\times 8$. I. dissected male flower, showing corolla and stamens $\times 8$. J. female flower $\times 8$. K. dissected ovary, female flower $\times 12$. **L–N: *D. geminata*.** L. male flower $\times 8$. M. female flower $\times 8$. N. fruit $\times 3$. A–C from Jago 3016 (BRI); D–F from Sharpe 4135 (BRI); G from Wightman 4110 (BRI); H, I from Hyland 13692 (BRI); J, K from White 12487 (BRI); L from Jessup 919B (BRI); M from Jessup 919A (BRI); N from Specht & Salt W531 (BRI).

to Brown (1810) describing *Maba compacta* based on specimens from Pobassoo Island, NT (“North Coast Island Y2”) and *Maba reticulata* based on specimens from Goods Island, Qld (“Prince of Wales Islands e”). Two taxa were also recognised by Bentham (1868) and by Bailey (1900) but extensive collecting since then has served only to blur any previously perceived boundaries between them. Differences in the calyx noted by the above two authors can be attributed to the degree of maturity of the fruit. Despite searches by myself and others the type of *Maba interstans* F.Muell. has not been found.

9. *Diospyros areolifolia* Kosterm., *Blumea* 23: 452 (1977). **Type:** Papua New Guinea. WESTERN DISTRICT: Fly River area, Tarara, Wassi Kussa River, 7 January 1936, *L.J. Brass* 8738 (holo: L.n.v.; iso: A, online image!, BRI).

Small or large tree, once recorded with 90 cm gbh. Twigs with sparse appressed hairs, soon glabrous. Leaves: petiole 3–4 mm long and flat above, with scattered short erect hairs above and appressed hairs below, glabrescent; lamina obovate or oblong-elliptic, (2.5–)4–6(–8) cm long 1.5–3 cm wide; base cuneate or shortly attenuate; glands 1 or 2 on each side of midvein on basal half of lamina below; margins flat; apex obtuse; glabrous above and below or with a few scattered appressed hairs around the midvein below; midvein depressed above, secondary veins 4–8 pairs, hardly distinguishable from the prominent reticulate venation on both surfaces. Male inflorescence axes 2.5–3.5 mm long, pubescent, with mostly erect pale brown hairs *c.* 0.1 mm long, glabrescent. Male flowers not seen. Female flowers not seen. Fruit peduncle 1 mm long; fruiting calyx shallowly cupular, appressed to base of fruit throughout, 2–3 mm long, 5–7 mm diameter, glabrescent outside, appressed pubescent inside, lobes 3, very short and rounded or depressed triangular. Fruit globose, *c.* 7 mm diameter (immature), appressed pubescent towards style, glabrescent, persistent style *c.* 1.2 mm long.

Additional specimen examined: Queensland. COOK DISTRICT: Wasp Creek area near Lockerbie, Cape York Peninsula, Nov 1962, *Hyland* 2517 (BRI).

Distribution and habitat: The species occurs in Queensland on northern Cape York Peninsula (**Map 5**) and in Papua New Guinea.

Note: This species appears to be closely related to *Diospyros compacta*. The type bears only immature fruit and the Queensland specimen appears to be male but has only peduncles lacking flowers. Additional collections are needed to confirm its status as a distinct species.

10. *Diospyros humilis* (R.Br.) F.Muell., *Austral. Veg.* 35 (1867); *Maba humilis* R.Br., *Prodr.* 527 (1810); *Ebenus humilis* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891); *Diospyros ferrea* var. *humilis* (R.Br.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 57–62 (1937). **Type:** [Queensland. PORT CURTIS DISTRICT.] Upper Head, Broadsound, [12 & 13 September 1802], *R. Brown iter Austral.* 2834 (holo: BM).

Maba obovata R.Br., *Prodr.*, 527 (1810); *Ebenus obovata* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891); *Maba ovata*, *orth. var.* F.Muell., *Hooker's J. Bot. Kew Gard. Misc.* 8: 326 (1856). **Type:** [Northern Territory.] Carpentaria Island a, b, c, 17–28 November 1802, *R. Brown iter Austral.* 2835 (holo: BM).

Illustration: Cooper & Cooper (2004: 155).

Shrub or tree to 10 m. Twigs with caducous appressed hairs and persistent short erect hairs. Leaves: petiole 0.9–5 mm long, puberulous with erect hairs; lamina obovate, rarely elliptic, 0.8–3(–5.4) cm long, 0.5–3 cm wide; base cuneate; glands up to 10 on each side of midvein, mostly in basal half; margins flat; apex rounded or obtuse; glabrescent or glabrous above, with scattered appressed hairs below, midvein above puberulous with erect hairs; midvein above depressed, secondary veins 4–10 pairs, reticulate veins not raised above. **Male** inflorescence axes 1–4 mm long; with (2–)3(–4) flowers. Male flower pedicel 0–0.5 mm long, pubescent. Calyx tube 1.5–2 mm long, lobes 3, 0.7–1.5 mm long, triangular, acute or obtuse, glabrous or with few hairs on lobes inside, appressed pubescent outside. Corolla tube 2–3 mm long; lobes 3, ovate to triangular, 1.5–2 mm long, upper part of tube and middle of lobes densely

appressed sericeous outside, glabrous inside. Stamens mostly 9, 3 singles and 3 pairs with filaments connate at base, 2.5–3 mm long, filaments not adnate to tube, 0.75–1.5 mm long, glabrous; anthers linear, 1.4–2 mm long; pistillode *c.* 0.5 mm long, pubescent. **Female** flowers solitary, peduncle to 0.5 mm long. Calyx tube 1.7–2.4 mm long, 3-lobed, lobes triangular, obtuse, 1–1.5 mm long, indumentum as in males. Corolla tube 1.75–3 mm long, lobes 3, broadly ovate, obtuse to rounded, 1.5–2 mm long, indumentum as in males. Staminodes absent. Ovary *c.* 1.8 mm long, glabrescent except for some persisting hairs around the style, 3-locular, ovules 2 per locule, style up to 0.5 mm long, pubescent, stigmas bifid. Fruiting calyx cupular, appressed to base of fruit throughout, 4–5 mm long with rounded or obtuse lobes. Fruit ellipsoid to nearly globular, 10–15 mm long, 7–9 mm wide, yellow or orange, glabrous or nearly so, 1–3-seeded; seeds 7–9 mm long. **Fig. 3H–K.**

Additional selected specimens examined: **Western Australia.** Cape Leveque, Apr 1988, *Dunlop 7826* (BRI); N of remote weather station, 29 km N of mining camp, Mitchell Plateau, N. Kimberley, *s. dat.*, *Kenneally 8554* (BRI). **Northern Territory.** Arnhem Land; mouth of King River, Oct 1992, *Cowie 3110* (BRI); Cutta Cutta Caves, Oct 1988, *Russell-Smith 6169 & Lucas* (BRI); Bremer Island, Jul 1992, *Leach 2993* (BRI). **Queensland.** COOK DISTRICT: 4 km N of Edward River Community, Dec 1979, *Clarke 1091* (BRI); Brooklyn, on track to Pennyweight Yards to junction with McLeod River, Nov 2008, *Jensen 1695 & Stanton* (BRI); Brooklyn Nature Refuge, near Mt Carbine, Nov 2006, *McDonald KRM5936 et al.* (BRI). BURKE DISTRICT: Between Tully and Massacre Inlets, Carpentaria region, Aug 1988, *Hyland 13575* (BRI); Bowthorn Station, 34.6 km NNW of Bowthorn homestead beside Hedleys Creek, Jul 2006, *Thompson WES752 & Hogan* (BRI); Woodu (Muwera) between Nyuldorg and Thabugan Point, Mornington Island, Sep 1981, *Fosberg 62083* (BRI); Karumba, Aug 1943, *Blake 15129* (BRI) & *15129A* (BRI); 18 miles [28.8 km] NW of Normanton township, Aug 1953, *Perry 3959* (BRI, CANB). NORTH KENNEDY DISTRICT: 40 Mile Scrub, Nov 1988, *Hyland 13692* (BRI) & *13693* (BRI). SOUTH KENNEDY DISTRICT: 3 km (direct) NW of haul road overpass, near Newlands coal mine, WNW of Glenden, Jun 2009, *Bean 29019* (BRI). LEICHHARDT DISTRICT: Dry Creek Valley, eastern side of Ka Ka Mundi section, Carnarvon NP, Aug 1990, *McDonald 4621 & Bean* (BRI); Nathan Gorge, 23 km SW of Cracow, Cabbagetree Creek, Apr 1991, *Telford 11055 & Rudd* (BRI). PORT CURTIS DISTRICT: Marmor, Nov 1943, *White 12487* (BRI). BURNETT DISTRICT: Goodnight Scrub NP, Aug 2009, *Jessup 5260 & Bell*

(BRI). WIDE BAY DISTRICT: Emu Creek Road, between Dallarnil & Degilbo, Sep 1999, *Forster PIF24915* (BRI). MARANOVA DISTRICT: Western end of Eumina land, 2 km E of junction with the Orallo Road and adjacent to Stanhope Downs, 44 km by road NW of Roma along the Orallo Road, Oct 1996, *Thomas s.n.* (BRI [AQ651179]). DARLING DOWNS DISTRICT: 14 km S of Bunya Mountains on road to Dalby, Aug 1972, *Sharpe 137* (BRI); McEwan SF, Stoneleigh, off Young road, *c.* 5 km N of Pittsworth, Jul 2011, *Menkins ILM0536* (BRI).

Distribution and habitat: *Diospyros humilis* occurs across northern Australia, from the Dampier Peninsula, northern Western Australia, Northern Territory, and from Torres Strait to Pittsworth southwest of Toowoomba, southeast Queensland (**Map 6**). The species is also found in Timor and Papua New Guinea. It occurs in rainforest, open woodland or deciduous, semi-deciduous microphyll or notophyll vine thicket, on sandy soils, sandstone, limestone karst, or soil derived from basalt.

Phenology: Flowers have been recorded from October to January and fruit from February to December.

Note: Bentham (1868) placed *Maba obovata* in synonymy under *M. humilis* referring to the fact that Brown's specimens of the former had male flowers while specimens of the latter bore fruit. Numerous subsequent collections have revealed some minor differences in leaf size and fruit shape across the range of specimens from eastern Queensland to Western Australia but I am inclined to continue to recognise just the one taxon.

11. *Diospyros geminata* (R.Br.) F.Muell., *Austral. Veg.* 35 (1867); *Maba geminata* R.Br., *Prodr.* 527 (1810); *Ebenus geminata* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891); *Diospyros ferrea* var. *geminata* (R.Br.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 58, 64 (1937). **Type:** [Queensland. PORT CURTIS DISTRICT:] Keppel Bay Broad Sound, Thirsty Sound, Broad Sound, [August – September 1802], *R. Brown iter Austral.* 2833 (syn: BM, K).

Shrub or tree rarely more than 12 m high. Twigs with very few appressed hairs, glabrescent. Leaves: petiole 2.5–5 mm long, glabrescent; lamina obovate, or elliptic, 3–7.5 cm long, 1–5 cm wide; base attenuate; glands

mostly 1–5 on each side of midvein in basal half; margins sometimes recurved; apex obtuse or rounded; glabrescent or glabrous; midvein slightly depressed above, secondary veins 5–8 pairs, reticulate veins scarcely raised above. **Male** flowers fasciculate on several condensed axes, with mostly 7–20 flowers in each axil. Flower sessile, calyx tube 1.4–2 mm long, lobes 3(–4), 0.6–1 mm long, appressed puberulous, glabrescent outside, appressed pubescent inside. Corolla tube 2.5–3.7 mm long, lobes mostly 3, oblong or ovate, 2–2.5 mm long, inside glabrous, outside appressed pubescent. Stamens 6–9, 2.5–3.5 mm long, filaments not adnate to tube, glabrous, 1.5–2 mm long; anthers linear, 1.5–2 mm long; pistillode 0.5–1 mm long. **Female** flowers fasciculate, sessile, 2–4 on a very short common peduncle. Calyx 3-lobed, tube 1.3–1.8 mm long; lobes 0.8–1.1 mm long, obtuse or rounded, appressed puberulous, sparsely outside, densely inside. Corolla tube 2.5–3.5 mm long, lobes 3, 2–2.5 mm long, obtuse, outside appressed pubescent. Staminodes absent. Ovary 1.5–2 mm long, sericeous, 3-locular; ovules 2 per locule; style 0.4–0.6 mm long, pubescent. Fruiting calyx cupular, lobes appressed to base of fruit throughout. Fruit usually 1 or 2(–4) on a common peduncle, broadly ellipsoid or subglobose, 10–11 mm long, 6–7(–10) mm wide, glabrescent with some appressed hairs remaining around and below the style remnant, 1–3-seeded; seeds 6–7 mm long. **Fig. 3L–N.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Pennefather River, Nov 2002, *Kemp TH6155 & Kutt* (BRI); Lake Patricia, Weipa, Dec 1993, *Forster PIF14404* (BRI); 8.5 km NW of Weipa Mission, Jul 1974, *Specht & Salt W531* (BRI). NORTH KENNEDY DISTRICT: Castle Hill, Townsville, Feb 1992, *Bean 4064* (BRI); Tuckers Range, Jul 1993, *Fensham 953* (BRI); Woodwark Bay, Apr 1991, *Forster PIF8243 & Bean* (BRI); Mingela Bluff, Jan 1992, *Forster PIF9439 & Bean* (BRI); Mount Louisa West, 30 km SW of Home Hill, Aug 1991, *Bean 3523* (BRI). SOUTH KENNEDY DISTRICT: N end of Ten Mile Beach, 5 km S of Midge Point, Repulse Bay, Jun 1994, *Batianoff 9406106* (BRI); Keswick Island, Victor Bay Gully, Sep 1996, *Batianoff 960965 et al.* (BRI); Homestead Bay, St Bees Island, Apr 1989, *Batianoff 11263* (BRI). LEICHHARDT DISTRICT: Lake Elphinstone, *s. dat.*, *Dietrich 1654* (BRI, MEL). PORT CURTIS DISTRICT: Yeppoon, Keppel Bay, Sep 1931, *White 8126* (BRI); Dan Dan Scrub SF, Boyne Range, Jan 2009, *Forster PIF33359 et al.* (BRI). BURNETT DISTRICT:

Goodnight Scrub, c. 65 km SW of Bundaberg, Jun 1957, *Smith 9836* (BRI, L). WIDE BAY DISTRICT: Stony Creek, 4 km E of Didcot, Oct 1990, *Forster PIF7514* (BRI); *loc. cit.*, Nov 1993, *Telford 11970* (BRI); NW base of Mt Boogooramunya, SF 648, Jan 1989, *Forster PIF4903* (BRI); Near Imbil, Jun 1947, *Smith & Webb 3132* (BRI, L). DARLING DOWNS DISTRICT: Northern foothills of Bunya Mountains, 51 km from Kingaroy on Dalby Road, Nov 1984, *Rodd 4223* (BRI). MORETON DISTRICT: Indooroopilly, near Brisbane River, 1.5 km upstream from Walter Taylor Bridge, Jan 1993, *Jessup 919A & 919B* (BRI); Palen Creek SF near Mt Lindesay, Nov 1993, *Grimshaw G97* (BRI).

Distribution and habitat: *Diospyros geminata* occurs in eastern Queensland from Cape York Peninsula to near Mt Lindesay (**Map 7**), and is also in Papua New Guinea. It is found in microphyll and notophyll vine forest or vine thicket.

Phenology: Flowers have been recorded from December to August and fruit from February to December.

12. *Diospyros littorea* (R.Br.) Kosterm., *Blumea* 23: 461 (1977); *Maba littorea* R.Br., *Prodr.* 527 (1810); *Maba buxifolia* var. *littorea* (R.Br.) Hiern, *Nova Guinea (Botanique)* 8 (1909); *Diospyros ferrea* var. *littorea* (R.Br.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 434 (1941). **Type:** [Northern Territory.] N Coast Bay No 3, Point y2, 3 March 1803, *R. Brown iter Austral.* 2832 (holo: BM).

Maba buxifolia auct. non (Rottb.) Pers.; Hiern, *Trans. Cambridge Philos. Soc.* 12: 116–117 (1873).

Diospyros ferrea var. *littorea* f. *laurina* (R.Br.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 434, 441 (1941) excluding type. Misapplied name.

Tree to 10 m. Twigs with appressed medifixed hairs, glabrescent. Leaves: petiole 2–6 mm long, glabrescent; lamina narrowly obovate, oblanceolate or elliptic, 2.5–11.5 cm long, 1.5–5 cm wide; base cuneate; glands usually 1–3 on each side of midvein near base; margins often undulate or recurved; apex rounded or retuse; glabrous above, with scattered appressed hairs below, glabrescent; midvein above depressed, secondary veins 10–15 pairs. **Male** inflorescence axes branched, up to 5 mm long, pubescent, with 3–7 flowers in each axil, pedicel to 1.5 mm long. Calyx

tube 0.75–1.25 mm long, lobes 3, 2–2.5 mm long, obtuse or acute, calyx outside sparsely appressed pubescent, inside glabrous. Corolla tube 3.5–4 mm long, lobes 3, narrowly ovate or oblong; 2–3 mm long, upper part of tube and middle of lobes densely appressed sericeous outside, glabrous inside. Stamens 6–9, 3–3.5 mm long; filaments not adnate to tube; glabrous; 1–1.2 mm long; anthers linear, 2–2.5 mm long; pistillode *c.* 0.5 mm long, pubescent. **Female** flowers solitary on a peduncle *c.* 2 mm long. Calyx tube 2.5–3 mm long, 3-lobed, lobes broadly triangular, acute or obtuse, 1.3–1.8 mm long, indumentum as in males. Corolla tube 2.5–3.5 mm long, lobes 3, broadly ovate, obtuse to rounded, 2.5–3 mm long, indumentum as in males. Staminodes absent. Ovary 1.7–2 mm long, glabrous, 3-locular, ovules 2 per locule, style 0.5–1 mm long, sparsely pubescent at base. Fruiting calyx cupular, appressed to base of fruit throughout, 4–4.5 mm long with depressed triangular or rounded lobes. Fruit ellipsoid or oblong, sometimes subglobose, 11–16.8 mm long, 7–14 mm wide, apex rounded or flat, glabrous, yellow or red, up to 6-seeded; seeds to 10 mm long. **Fig. 4A–E.**

Additional selected specimens examined: **Western Australia.** Camp on unnamed tributary of Prince Regent River, arising 19 km SE of the mouth, Jun 1984, *Kenneally 8920* (PERTH). **Northern Territory.** Northeast coast of Cape Van Diemen, Melville Island, May 1978, *Webb & Tracey 12741* (BRI, CANB); Maxwell Creek, Melville Island, Jan 1990, *Russell-Smith 8168 & Lucas* (BRI); Adelaide River, Daly River Road, Nov 1982, *Dunlop 6244 & Wightman* (BRI); Adelaide River, Feb 1979, *Rankin 1752* (BRI, L); 30 km NE of Numbulwar, Nov 1987, *Russell-Smith 4231 & Lucas* (BRI); Black Jungle, Oct 1990, *Brock 736* (DNA); NE Arnhem Land, 2 km S of Lake Peter John, Feb 1988, *Russell-Smith 4984 & Lucas* (BRI); Yirrkala, Gove Peninsula, Oct 1983, *Wightman 810* (BRI); Latram Range, Gove Peninsula, Feb 1988, *Russell-Smith 4984 & Lucas* (BRI); Macarthur River mouth, 14 km SE of Pelican Spit, Jan 1989, *Russell-Smith 6785 & Lucas* (BRI, MEL). **Queensland.** COOK DISTRICT: Saibai Island, Oct 2007, *Fell DGF8655 & Stanton* (BRI); Olive River, Nov 1978, *Stirling 516* (BRI); Quintil Creek, Lockhart River Aboriginal Reserve, Nov 1977, *Tracey 14598* (BRI); Normanby River, Aug 1979, *Duke AIMS674* (BRI); Batavia [Wenlock] River, in 1888, *Milman s.n.* (BRI [AQ183600]); Claudie River, Aug 1979, *Duke AIM655* (BRI); Marrett River, Princess Charlotte Bay, May 1979, *Elsol 666 & Stanley* (BRI).

Distribution and habitat: *Diospyros littorea* occurs in the Prince Regent River area, WA, in the NT from the Daly River to the Macarthur River and in Queensland from Torres Strait to Princess Charlotte Bay (**Map 7**) in coastal and estuarine vine forest and thickets fringing mangroves. It also occurs from Thailand to Papua New Guinea.

Phenology: Flowers have been recorded from June to December, and fruit throughout the year.

Note: Bakhuizen van den Brink (1941: 434, 440) included Australia in the distribution of *D. ferrea* var. *littorea* f. *lamponga* (Miq.) Bakh., without citing any Australian specimens but also apparently suggesting this form may not be distinct from typical *Maba littorea* R.Br. [“ ? an *Maba littorea typica* (1810)”].

13. *Diospyros laurina* (R.Br.) Jessup **comb. nov.**; *Maba laurina* R.Br., *Prodr.*, 527 (1810); *Ebenus laurina* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891). **Type:** [Queensland. SOUTH KENNEDY DISTRICT:] Cumberland Islands, 17 October 1802, *R. Brown iter Austral. 2836* (holo: BM; iso: E, K).

non Diospyros laurina Massalongo, *nom. nud.*, see Notes below).

Diospyros cupulosa (F.Muell.) F.Muell., *Austral. Veg.* 35 (1867); *Maba cupulosa* F.Muell., *Fragm.* 5: 164 (1866). **Type:** [Queensland.] Rockingham Bay, *s.dat.*, *J. Dallachy s.n.* (lecto [here designated]: K 000792604, consisting of two mounted branchlets with fruit attached and loose fruit in the fragment packet with *M. cupulosa* written thereon in Mueller’s hand).

Diospyros sericocarpa F.Muell., *Austral. Veg.* 35 (1867); *Maba sericocarpa* F.Muell., *Fragm.* 5: 164 (1866). **Type:** [Queensland.] Rockingham Bay, *s.dat.*, *J. Dallachy s.n.* (lecto [here designated]: K 000792603, top left hand mounted specimen and loose fruits in the bottom left fragment packet with *M. sericocarpa* written thereon in Mueller’s hand).

Maba rufa auct. non Labill.; Hiern (1873: 114); Bailey (1900: 963, 1913: 306); Bakhuizen van

den Brink (1936: 444–445); *neque D. rufa* King & Gamble, *J. Asiat. Soc. Bengal, Part 2, Nat. Hist.* 74 (1): 228 (1906).

Illustration: Cooper & Cooper (2004: 154).

Tree to 20 m, often flowering as a shrub. Twigs with dense appressed basifixed reddish-brown hairs, glabrescent. Leaves: petiole 3–8 mm long, glabrescent; lamina elliptic or oblanceolate, 6–13 cm long, 2–5 cm wide; base acute or obtusely cuneate; glands mostly 1–3 on each side of midvein in basal half; margins flat; apex acute, shortly acuminate or rounded; at first with dense appressed hairs both sides, soon glabrescent; midvein above depressed, secondary veins 6–10 pairs, often obscure. **Male** inflorescence axes branched, 1.5–5 mm long, appressed pubescent, usually with 3–12 flowers. Calyx tube 4.5–5.5 mm long, lobes 3, 0.5–1 mm long, obtuse, calyx appressed pubescent outside, glabrous inside. Corolla tube 8–11 mm long; lobes 3, broadly ovate, 2–3 mm long, corolla appressed pubescent outside, glabrous inside. Stamens 9; 7–8.7 mm long; filaments not adnate to tube, 3.5–4 mm long, glabrous; anthers linear, 4–4.5 mm long; pistillode 1–1.5 mm long, pubescent. **Female** flowers 1(–3) in each axil, pedicel to 2 mm long; calyx tube 4.5–5 mm long, appressed pubescent inside and outside, 3(–4)-lobed, lobes 2.5–3 mm long, obtuse or rounded. Corolla tube 7–8 mm long, lobes 3, narrowly ovate, acute, 4–5 mm long, indumentum as in males; staminodes absent; ovary 4–4.5 mm long, coarsely sericeous, 3-locular, ovules 2 per locule, style 1–1.5 mm long, pubescent. Fruiting calyx indurated, accrescent, 14–17 mm long, appressed to base of fruit with lobes 3–6 mm long, slightly recurving, inside sericeous, outside reddish-brown pubescent. Fruit ellipsoid to subglobose, 15–18(–20) mm long, 13–15 mm wide, pubescent, up to 6-seeded; seeds 6.5–7.5 mm long. **Fig. 4F–L.**

Additional selected specimens examined: Queensland. COOK DISTRICT: 5 km east along Captain Billy Landing road, off Heathlands to Bamaga Road, Cape York Peninsula, Jun 2008, *Forster PIF33747 & McDonald* (BRI); NPR 8 Parish of Weymouth, Oct 1981, *Hyland 11204* (BRI); TR 14 (McIlwraith Range – Leo Creek Road), Sep 1975, *Hyland 8442* (BRI); Rocky River, Sep 1971, *Hyland 5474* (BRI, L); Head of Temple Creek, Cape Melville NP, May 1994, *Fell DGF4340A* (BRI); Oliver Creek, Jul 1997, *Hyland 15749* (BRI); Daintree

River, Dec 1929, *Kajewski 1448* (BRI); Mossman River Gorge, Feb 1932, *Brass 2136* (BRI); Churchill Creek, Churchill LA, SF 143, Jul 1995, *Forster 17210 & Figg* (BRI); SFR 1073, Saddle Mt, near Kuranda, Nov 1966, *Berry NQNC14812* (BRI); Smithfield, Saddle LA, Jan 1982, *Hyland 11493* (BRI); SF 607 Freshwater Creek, 7 km along road to Copperlode Dam, Oct 2001, *Forster PIF27564 et al.* (BRI); Bridle Creek, c. 12 miles [19.2 km] SE of Mareeba, Nov 1973, *Hartley 14149 & Hyland* (BRI); SFR 310, Gadgarra, Goldsborough LA, Mar 1993, *Hyland 25826RFK* (BRI); SFR 933, Trinity, Little Pine LA, Oct 1988, *Hyland 25587RFK* (BRI); Lake Barrine, Atherton Tableland, Jul 1929, *Kajewski 1154* (BRI); Malanda, Aug 1943, *Blake 15175* (BRI); Palmerston NP, west of Crawford Lookout, Jan 1993, *Bean 5414* (BRI). NORTH KENNEDY DISTRICT: Alcock FR, rafting access point no. 9, 5.2 km from Tully River camping area, Feb 2002, *Ford AF3280 & Holmes* (BRI); South Pinnacle, c. 30 km SW of Townsville, Oct 1998, *Cumming 17904* (BRI); Gregory Creek at junction of Gregory River, Nov 1987, *Perry 2* (BRI); Gregory Creek, c. 2 km NE of Gregory and 15 km N of Proserpine, Nov 1985, *Sharpe & Perry s.n.* (BRI [AQ423717]). SOUTH KENNEDY DISTRICT: Scawfell Island NP, 50 km ENE of Mackay, Nov 1986, *Batianoff 6221 & Krieger* (BRI); Cut Creek at base of Eton Range, SF 652–658, Mackay, Oct 1986, *Ritchie 49* (BRI).

Distribution and habitat: *Diospyros laurina* occurs in northern Queensland from northern Cape York Peninsula to south of Mackay (**Map 8**) in mesophyll and notophyll vineforest and wet sclerophyll forest. It also occurs in Papua New Guinea.

Phenology: Flowers have been recorded from September to November, and fruit from July to February.

Notes: Massalongo (1859) included in a list of fossil species the following: “*Diospyros laurina* Massal. Chiavon.” This name is a *nomen nudum* leaving the way open for a new combination to be made based on *Maba laurina* R.Br. which predates *M. cupulosa* F.Muell.

Mueller (1866: 164) described *Maba cupulosa* and *M. sericocarpa* sequentially and both from fruiting material collected by J. Dallachy from Rockingham Bay. The only Dallachy specimens with these two names written in Mueller’s hand and with fruiting material are the sheets at Kew cited above and these are selected as the lectotypes of these two names. The other branchlets mounted on K 000792603 have male flower buds and cannot be considered part of the gathering described

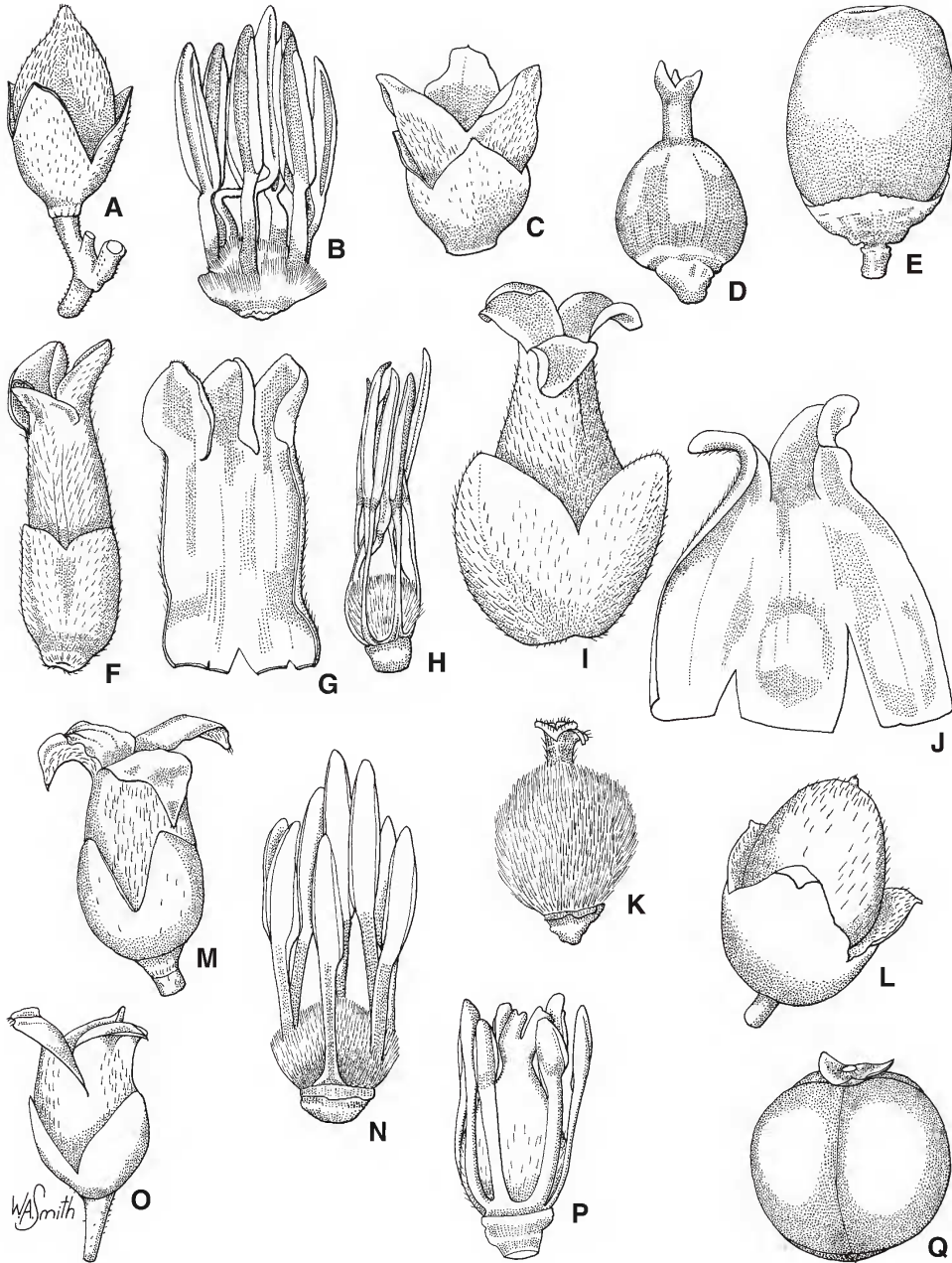


Fig. 4. A–E: *Diospyros littorea*. A. male flower $\times 4$. B. dissected stamens and pistillode, male flower $\times 8$. C. female flower $\times 4$. D. dissected ovary, female flower $\times 8$. E. fruit $\times 2$. F–L: *D. laurina*. F. male flower $\times 3$. G. dissected corolla, male flower $\times 3$. H. dissected stamens and pistillode, male flower $\times 4$. I. female flower $\times 4$. J. dissected corolla, female flower $\times 4$. K. dissected ovary, female flower $\times 4$. L. fruit $\times 1.5$. M–Q: *D. hemicycloides*. M. male flower $\times 8$. N. dissected stamens and pistillode, male flower $\times 8$. O. female flower $\times 4$. P. dissected ovary and stamens of possible hermaphrodite flower $\times 8$. Q. fruit $\times 4$. A, B from Dunlop 6244 & Wightman (BRI); C, D from Brock 736 (DNA); E from Duke AIMS674 (BRI); F–H from Perry 2 (BRI); I–K from Sharpe & Perry s.n. (BRI [AQ423717]); L from Forster PIF27564 et al. (BRI); M & N from Hyland 11362 (BRI); O & P from Hyland 25238RFK (BRI); Q from Forster PIF14336 (BRI).

by Mueller. The reference by Bailey (1900: 963) to a specimen of *M. sericocarpa* from Eumundi is incorrect and most likely refers to *D. yandina*.

14. Diospyros hemicycloides (F.Muell. ex Benth.) Jessup **comb. nov.**; *Maba hemicycloides* F.Muell. ex Benth., *Fl. Austral.* 4: 290 (1868); *Ebenus hemicyclodes* (Benth.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891). **Type:** [Queensland.] Rockingham Bay, 13 August 1866, *J. Dallachy s.n.* (syn: MEL 92395; isosyn: K 000792767); Mackay River [Tully River], “Habit of Hemicyclia” in Mueller’s hand, 11 August 1866, [*J. Dallachy s.n.*] (syn: MEL 233341A).

Diospyros sp. Q2 (Tinaroo Range J.G. Tracey 13936); Jessup (1994, 1997, 2002).

Diospyros sp. (Mt Lewis L.S. Smith 10107); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Mt Lewis); Cooper & Cooper (2004: 156).

Illustration: Cooper & Cooper (2004: 156), as *D. sp.* (Mt Lewis).

Tree to 18 m, often flowering as a shrub. Twigs with appressed submedifixed pale brown hairs and minute erect hairs, glabrescent. Leaves: petiole 1.5–5 mm long, glabrescent; lamina elliptic, oblanceolate or lanceolate, 3.5–10 cm long, 1–3 cm wide; base cuneate or shortly attenuate; glands small and sparse, up to 5 on each side of midvein below; margins sometimes undulate, apex shortly acuminate or acute; glabrous above, glabrescent below; midvein on upper surface depressed, secondary veins 7–11 pairs. **Male** inflorescence axes 2–9 mm long, with 3(–4) flowers, appressed pubescent, glabrescent. Calyx tube 1.5–2 mm long, lobes 3, 1.5–2 mm long, obtuse or scarcely acute, calyx glabrescent outside, glabrous inside. Corolla tube 2.5–3.5 mm long, lobes 3(–4), ovate or triangular with sides incurved, 3–4 mm long, pubescent outside, glabrous inside. Stamens 7–9, 2–2.5 mm long, filaments not adnate to tube, glabrous, 1.5–1.8 mm long; anthers linear, 1–1.2 mm long; pistillode 1(–2) mm long, pubescent, sometimes with developed styles. **Female** flowers usually solitary, rarely

a 3-flowered cyme, peduncle 3–7.5 mm long, glabrescent, pedicel to 1 mm long. Calyx tube 2–2.5 mm long, lobes 3, connate in bud, 2–2.5 mm long, obtuse or acute, glabrescent outside, glabrous inside. Corolla tube 2.5–3 mm long lobes 3, triangular, acute with sides incurved, 2–2.5 mm long, pubescent outside, glabrous inside. Stamens absent. Ovary 2.2–2.5 mm long, sericeous, 3-locular, ovules 2 per locule, style 0.7–1 mm long, with appressed hairs at base, stigmas bifid. Fruiting calyx appressed to base of fruit, 4 mm long, fruit globose or broadly obovoid-ellipsoid, 13–16 mm long, 11–14 mm wide, with scattered appressed hairs, glabrescent; seeds 8–10 mm long. **Fig. 4M–Q.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Cedar Bay NP, Mt Finnigan summit area, Horans Creek, Oct 1999, *Forster PIF25062 & Booth* (BRI); Kanawarra, Carbine LA, Nov 1987, *Hyland 25238 RFK* (BRI); Riflemead, Carbine LA, Oct 1988, *Hyland 25556 RFK* (BRI); North Mary LA, [SF]R143 Mt. Lewis, Sep 1973, *Sanderson 335* (BRI); On Mt Lewis Road, 18 km from junction with Mareeba – Mossman Road, Oct 1987, *Foreman 1833* (BRI); SF 143, 15.5 km along Mt Lewis Road, Oct 1999, *Forster PIF25118 & Booth* (BRI); Mt Lewis Road, Aug 1957, *Smith 10107* (BRI); Daintree NP, Mt Sorrow track razorback, 4 km W of Cape Tribulation, Dec 1997, *Forster PIF22004 et al.* (BRI); Davies Creek, Aug 1954, *Smith 5267* (BRI); SFR 185 Danbulla, Tinaroo, Aug 1981, *Tracey 13936* (BRI); SF 185 Danbulla, Tinaroo LA, 7.5 km past western boundary of forestry grid, Dec 1993, *Forster PIF14336* (BRI). Tinaroo Range, Jun 1970, *Moriarty 310* (BRI); Mt Bartle Frere, 1.8 km WSW of Bobbin Bobbin Falls, 4.4 km NNE of Boonjee, Nov 1988, *Jessup GJM1131 et al.* (BRI); SF 194 Mt Baldy, 8 km from Rifle Range end, Jun 1996, *Forster PIF19223 et al.* (BRI); Hugh Nelson Range, Nov 1958, *Smith 10504* (BRI); The Crater NP, Atherton Plateau, Sep 1981, *Fosberg 61674* (BRI). NORTH KENNEDY DISTRICT: Portion 205, Parish of Herberton, Keoghs Scrub, Dec 1991, *Gray 5400* (BRI); Tully Falls NP, 7.6 km along Tully Falls Road from Charmillan Creek bridge, Dec 2007, *Ford AF5196 & Metcalfe* (BRI); SFR 605 Luff LA, Dec 1981, *Hyland 11362* (BRI); 27 km south along Culpa road, SF 605 Koombooloomba, May 2002, *Forster PIF28775 & Booth* (BRI); Yuccabine Creek SF 344, Kirrama LA, 28 km NW of Cardwell, Oct 1988, *Jessup GJM2241 et al.* (BRI), *Jessup GJM2368* (BRI); Northern slope of Mt Thorn, SF 461 Meunga LA, 23.1 km W of Cardwell, Oct 1988, *Jessup GJM 2271 et al.* (BRI); Coast Range [adjacent to Rockingham Bay], Sep 1867, [*J. Dallachy*] (MEL 244448).

Distribution and habitat: *Diospyros hemicycloides* is endemic to northeast Queensland from Mt Finnigan to the Kirrama Range (**Map 9**) and occurs in simple to

complex notophyll vine forest on soils derived from granite.

Phenology: Flowers and fruit have been recorded from November and December.

Note: Flowers of *Hyland 25238RFK* were observed to sometimes have an enlarged ovary and stamens with slightly smaller anthers. Further collecting is required to determine if some plants of this species are andromonoecious or monoecious.

15. *Diospyros yandina* Jessup sp. nov.; resembling *D. hemicycloides* but differing in the more numerous secondary veins (15–30 pairs compared to 5–12), in the shorter male peduncle (*c.* 1 mm compared to 2–9 mm) and the fewer stamens (3–5 compared to 7–9). It differs from *D. cupulosa* in the fewer stamens (9 in *D. cupulosa*) and in the smaller, thinner, non-acrescent fruiting calyx. **Typus:** Queensland. WIDE BAY DISTRICT: Kin Kin Creek, beside track following boundary of Cooloola National Park, August 1981, *L.W. Jessup 430* (holo: BRI).

Diospyros ellipticifolia f. *australiensis* Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 430, 436 (1941). **Type:** Queensland. MORETON DISTRICT: Blackall Range, November 1916, *C.T. White s.n.* (holo: BRI [AQ183530]; iso: NSW).

Diospyros major var. *ebemus* f. *australiensis* Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 429 (1941). **Type:** Queensland. MORETON DISTRICT: Blackall Range, November 1916, *C.T. White s.n.* (holo: BRI [AQ183530]; iso: NSW).

Diospyros sp. (Blackall Range C.T.White AQ183530); Jessup (2013).

Maba sericocarpa auct. non F.Muell.; Baker (1899: 441–442), *neque* Bailey (1900: 963) *pro parte*, “Rockingham Bay, Dallachy”.

Diospyros sp.1; Stanley & Ross (1986: 280, 2002 reprint: 280).

Shrub or rarely a tree to 10 m. Twigs with appressed basifixed pale brown hairs and minute erect hairs, glabrescent. Leaves: petiole 2–3 mm long, glabrescent; lamina elliptic, narrowly oblong-ovate or lanceolate, 3–8(–11) cm long, 1–3 cm wide; base cuneate

or rounded; glands small and sparse, up to 5 on each side of midvein below; margins often undulate, slightly recurved; apex acute or shortly acuminate; glabrous above, sparsely appressed pubescent, glabrescent below; midvein on upper surface depressed, secondary veins mostly 9–18 pairs, sometimes difficult to distinguish from higher order veins. **Male** inflorescence peduncle *c.* 1 mm long, in the axils of reduced or normal leaves on new season growth, pubescent, with mostly 3 flowers, sessile or pedicels to 0.5 mm, pubescent. Calyx tube 1.5–2.5 mm long, lobes 3, mostly connate at first then 1–2 mm long, mostly acute, calyx appressed pubescent outside, glabrous inside. Corolla tube 4–4.5 mm long, lobes 3, ovate, 2–3 mm long, appressed pubescent or coarsely sericeous outside in the middle of the lobes with shorter indumentum between, glabrous inside. Stamens 3–5, 4–4.5 mm long, filaments not adnate to tube, glabrous, 1.3–1.8 mm long; anthers linear, 1.8–2.2 mm long; pistillode *c.* 1 mm long, pubescent. **Female** flowers solitary, peduncle *c.* 1 mm long, glabrescent, bract and bracteoles 2–2.5 mm long, pedicel 0–0.4 mm long. Calyx and corolla similar to males. Staminodes absent. Ovary 1.7–2 mm long, sericeous, 3-locular, ovules 2 per locule, style 0.25–0.5 mm long, appressed puberulous, stigmas bifid. Fruiting calyx distinctly trilobed, 7–9 mm diameter, only shortly appressed to base of fruit, the lobes spreading or recurved, fruit globose or depressed globose, 9–12 mm long, 11–15 mm wide, with scattered appressed hairs, glabrescent, crimson, 1–5-seeded; seeds 6–7 mm long. **Fig. 5A–C.**

Additional selected specimens examined: Queensland: WIDE BAY DISTRICT. Ramsays Scrub, Cooloola, May 1964, *Webb & Tracey 6348* (BRI); Mt Mothar, near Gympie, Oct 1977, *Webb & Tracey 11253* (BRI); Cooloola NP, road to Harry’s Hut, Oct 1982, *McDonald 3772 & Williams* (BRI); Road to Harry’s Hut, NE of Kin Kin, Sep 1993, *Bean 6467* (BRI); Lake Cootharaba, *s.dat.*, *Keys 75* (BRI); Kin Kin, *s.dat.*, *Francis s.n.* (BRI [AQ183541]); Mt Cooroy, 4 km E of Cooroy, Apr 1986, *Sharpe 4322 & Guymer* (BRI). MORETON DISTRICT. Mt Eerwah, 4 km W of Eumundi, Dec 1984, *Sharpe 3624* (BRI, L, MEL, NSW); Wappa Falls, South Maroochy River, *c.* 6 km SW of Yandina, Oct 1986, *Sharpe 4525 & Windolf* (BRI); Wappa Falls, Maroochy River, May 1959, *Smith 10545* (BRI); Yandina, Mar 1891, *Simmonds s.n.* (BRI [AQ183536]); 1 km S of Wappa Dam, SW of Yandina,

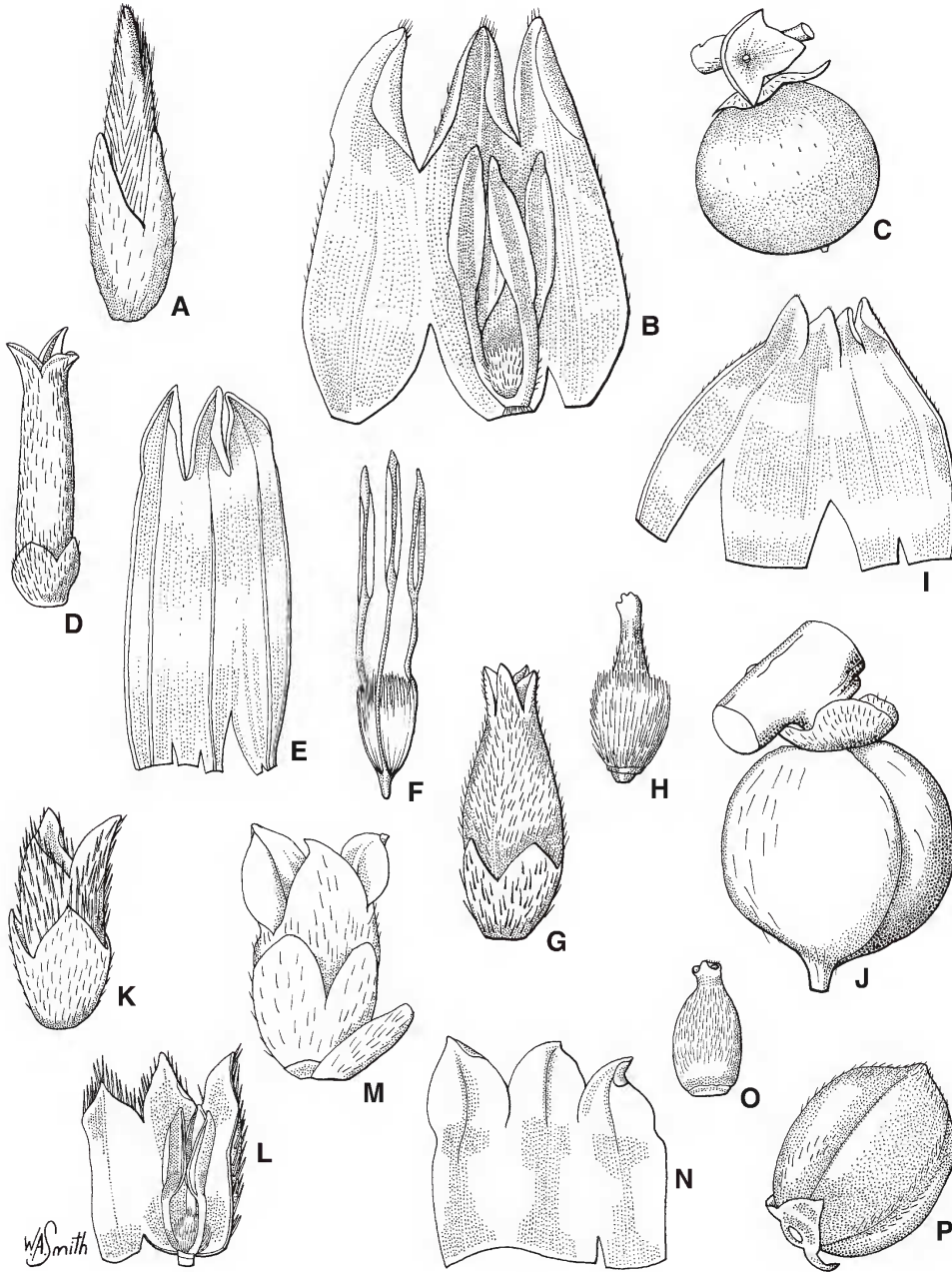


Fig. 5. A–C: *Diospyros yandina*. A. male flower $\times 6$. B. dissected corolla, stamens and pistillode $\times 8$. C. fruit $\times 2$. D–J: *Diospyros pensularis*. D. male flower $\times 4$. E. corolla, male flower $\times 6$. F. stamens and pistillode, male flower $\times 6$. G. female flower $\times 6$. H. dissected ovary, female flower $\times 6$. I. dissected corolla, female flower $\times 6$. J. fruit $\times 3$. K–P: *Diospyros pluviatilis*. K. male flower $\times 6$. L. dissected male flower showing stamens and pistillode $\times 6$. M. female flower $\times 6$. N. dissected corolla, female flower $\times 6$. O. dissected ovary, female flower $\times 6$. P. fruit $\times 2$. A, B from Bird s.n. (BRI [AQ396282]); C from Jessup 430 (BRI); D–F from Forster PIF633I (BRI); G–I from Forster PIF5442 (BRI); J from Williams 85195 (BRI); K, L from Gray 852 (BRI); M–O from Jessup 708 (BRI); P from Tracey 15551 (BRI).

Dec 1994, *Bean 8131* (BRI); Nambour – roadside park to N of town, Dec 1984, *Bird s.n.* (BRI [AQ396282]); Tuckers Creek, roadside rest area on highway just N of Nambour Dec 1980, *Jessup 272* (BRI); northern tributary of Petrie Creek, northern outskirts of Nambour, picnic area, just N of major intersection of Bli Bli – Mapleton Road, Dec 1986, *Beesley 889 & Ollerenshaw* (NSW); Andrew Doig Park, Murray Grey Drive, Maroochy Shire Council, 5 km WNW of Nambour, Dec 2006, *Forster PIF32363 et al* (BRI); William Doig Park, Murray Grey Drive, Maroochy Shire Council, 5 km WNW of Nambour, Dec 2006, *Forster PIF32389 et al.* (BRI); Murray Grey Drive, Dulong, west of Nambour, Dec 1993, *Bean 7212* (BRI); Buderim Mt, Apr 1916, *White s.n.* (BRI [AQ183529]). **New South Wales.** NORTH COAST: Tumbulgum, Feb 1897, *Baerleren 1889* (BRI), Oct 1897, *Baerleren s.n.* (BRI [AQ625613]), Dec 1897, *Baerleren s.n.* (NSW), Jan 1898, *Baerleren s.n.* (NSW).

Distribution and habitat: *Diospyros yandina* occurs from the Great Sandy NP, Cooloola section to Buderim Mt in southeast Queensland and in the Tweed River valley, NSW (**Map 9**), mostly in lowland notophyll vineforest.

Phenology: Flowers have been recorded from December to February and fruit from October to May.

Etymology: The species epithet commemorates the township of Yandina, Queensland where the earliest known collection of the species was made by J.H. Simmonds on 1 March 1891.

16. *Diospyros peninsularis* Jessup sp. nov.; resembling *D. yandina*, *D. hemicycloides* and *D. laurina* but differing in the midvein being raised on the upper surface of the lamina (not sunken), and differing from *D. yandina* in the fewer secondary veins (7–11 compared to 11–20), in the longer stamens (5–6 mm compared to 4–4.5 mm), and the longer style (c. 2 mm compared to less than 0.5 mm) and from *D. hemicycloides* in the fewer and longer stamens (up to 3 compared to 7–9, and 5–6 mm compared to 2–2.5 mm). It also differs from *D. laurina* in the much smaller and thinner calyx in both sexes and in fruit. **Typus:** Queensland. COOK DISTRICT: N bank of Pascoe River approx. 1 km inland from river mouth, 21 November 1977, *J.G. Tracey 14396* (holo: BRI, iso: *distribuendi*).

Diospyros sp. (Kuranda L.J. Webb+ 7265A); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Kuranda); Cooper & Cooper (2004: 156).

Diospyros sp. Bamaga (B.P.Hyland 2517) at [http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Diospyros_sp_Bamaga_\(B.P.Hyland_2517\).htm](http://keys.trin.org.au:8080/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Diospyros_sp_Bamaga_(B.P.Hyland_2517).htm) with respect to the description, images, and all specimens except the reference specimen. The reference specimen *Hyland 2517* is *Diospyros areolifolia*.

Diospyros sp. (Bamaga); Cooper & Cooper (2004: 156).

Shrub or tree to 10 m. Twigs with appressed or inclined submedifixed pale brown coarse hairs and minute erect hairs, glabrescent. Leaves: petiole 2.5–4 mm long, glabrescent; lamina elliptic, ovate or lanceolate, 3–10 cm long, 1–3 cm wide; base cuneate or rounded; glands small and sparse; margins slightly recurved and undulate; apex acute with a blunt tip; with scattered to sparse appressed or inclined hairs on both sides, glabrescent; midvein on upper surface raised, secondary veins mostly 7–11 pairs. **Male** inflorescence axes c. 1 mm long, 1– several fasciculate in leaf axils, pubescent, each usually terminating with 3 flowers, sessile or on pedicels to 1 mm, pubescent. Calyx tube 1–2.5 mm long, lobes 3, sometimes 4, connate at first then 1–2 mm long, acute, calyx appressed pubescent outside, hairs shorter and more sparse inside. Corolla tube 5–6 mm long, lobes mostly 3, ovate, 1.5–2 mm long, appressed pubescent or coarsely sericeous outside, glabrous inside. Stamens (2) or 3, 5–6 mm long, filaments not adnate to tube, glabrous, 2.5–3 mm long; anthers linear, 2.5–3 mm long; pistillode 0.5–0.8 mm long, pubescent. **Female** flowers solitary, peduncle 0.5–0.7 mm long, pubescent, bract and bracteoles 0.8–1 mm long, pedicel up to 0.2 mm long. Calyx tube 1.3–1.5 mm long, lobes 3(–4), broadly ovate, obtuse, 1–1.3 mm long, indumentum as in males. Corolla tube 4–4.5 mm long, lobes 3 or 4, navicular-ovate, 1.4–1.6 mm long, coarsely sericeous outside, glabrous inside. Staminodes absent. Ovary 2 mm long, coarsely sericeous, 2 or 3-locular, ovules 2 per locule, styles ± completely connate, to 2 mm long, stigmas 2 or 3. Fruiting calyx usually

flattened or recurved from base of fruit. Fruit globose or depressed globose, 8–10 mm long, 9–12 mm wide, glabrescent, reddish brown or orange, style remnant and surrounding hairs sometimes persisting, 1–4-seeded; seeds 5–8 mm long. **Fig. 5D–J.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Moa [Island] in Torres Strait, May 2003, *Wannan 2904 & Toh* (BRI); Lockerbie (abandoned), Lockerbie Scrub, 5 km from old homestead site, N, on Cape York Road, Sep 1985, *Williams 85195* (BRI); Lockerbie Scrub, 3 km past Lockerbie Homestead, Feb 1990, *Forster PIF6331* (BRI); 47 km from the Cape York Road on the track to Ussher Point, Jul 1992, *Clarkson 9675 & Neldner* (BRI); Restoration Island, Apr 1995, *Le Cussan 303* (BRI); Stoney Point, N of Pascoe River, Nov 1977, *Tracey 14154* (BRI); Pascoe River mouth, north bank, 33.8 km NNW of Lockhart River, Bromley Holding, North East Cape York peninsula, Apr 1993, *Fell DGF3154 & Butcher* (BRI); Between Iron Range and Portland Roads, Oct 1972, *Dockrill 557* (BRI, L); Iron Range, Oct 1983, *Sankowsky 267 & Sankowsky* (BRI); Head of Swamp Creek, Table Range, 11.9 km S of Lockhart River community, Apr 1994, *Fell DGF4295 & Daunt* (BRI); Junie Creek, Oct 1972, *Dockrill 574* (BRI); Alligator Creek, Oct 1972, *Dockrill 588* (BRI, L); McIlwraith Range, c. 11 miles [17.6 km] ENE of Coen, Oct 1962, *Smith 11784* (BRI); 33.2 km E by road of Maloney's Springs, 73.2 km E by road of Moreton Telegraph Station, Jun 1989, *Forster PIF5442* (BRI); c. 6 km SSW of Cape Flattery township, May 1990, *Clarkson 8628 & Neldner* (BRI); Abor. Res. 1, between McIvor River & Cape Flattery, Nov 1972, *Hyland 6538* (BRI, L); Bridge Creek Holding (proposed NP), upper Bridge Creek catchment; NW of Cooktown, May 2010, *Forster PIF36683 & Thomas* (BRI); Carrol Creek road crossing, NW of Hopevale mission, Dec 1984, *Jessup 647* (BRI, L).

Distribution and habitat: *Diospyros peninsularis* occurs on Cape York Peninsula, Queensland from near Cooktown to Torres Strait (**Map 9**), in several forms of semideciduous notophyll vine forest and araucarian vine thicket.

Phenology: Flowers have been recorded from February to July, and fruit from July to December.

Etymology: The species epithet refers to Cape York Peninsula where the majority of the specimens have been collected.

Notes: The species described here is the same taxon as the reference specimen cited in the phrase name *Diospyros* sp. (Kuranda L.J. Webb+ 7265A) but the locality details (Smithfield–Black Mt road via Kuranda)

provided on the label of the reference specimen are doubtful as no other specimens of this species have been found south of Carrol Creek near Cooktown.

17. *Diospyros pluviatilis* Jessup sp. nov.; resembling *D. yandina* but differing in the mostly larger leaves (3–5.5 cm wide compared to 1–3 cm wide), the more prominent secondary veins, more numerous flowers in the inflorescence and the persistent remnants of inflorescences on older branchlets. It differs from *D. hemicycloides* in the mostly more numerous flowers in each inflorescence and in the fewer stamens (3 or 4 compared to 7–9). **Typus:** Queensland. COOK DISTRICT: Souita Falls – Middle Brook Creek Road, SE of Millaa Millaa, 11 November 1992, *J.G. Tracey 15551* (holo: BRI; iso: *distribuendi*).

Diospyros sp. (Millaa Millaa L.W. Jessup 515); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Millaa Millaa); Cooper & Cooper (2004: 156).

Illustration: Cooper & Cooper (2004: 156), as *D.* sp. (Millaa Millaa).

Shrub to 3 m. Twigs with appressed sub-basifixed hairs and short erect basifixed hairs, glabrescent. Leaves: petiole 3–5 mm long, glabrescent; lamina elliptic or lanceolate, 8–14 cm long, 3–5.5 cm wide; base cuneate or rounded; glands small and sparsely scattered on undersurface; margins flat; apex shortly acuminate; adaxial surface glabrous, abaxial surface glabrescent; midvein above depressed, secondary veins 9–13 pairs forming prominent loops well within the lamina margin. **Male** inflorescences cauline, fasciculate, forming clusters of 5–20 flowers; peduncles with persistent overlapping bracts and peduncles persistent on older branchlets. Calyx tube 1–1.5 mm long, lobes (2–)3, 1–2 mm long, bluntly acute, calyx appressed pubescent outside, glabrous inside. Corolla tube 1.5–2 mm long, lobes 3, triangular, 1.5–2 mm long, appressed pubescent outside, glabrous inside. Stamens 3 or 4, 2.5–3 mm long, filaments attached below base of pistillode, not adnate to corolla tube, glabrous, 0.75–1 mm long; anthers linear, 1.7–2 mm long; pistillode c. 0.6 mm long, pubescent.

Female flowers 1–3 together, peduncles 1–1.5 mm long with persistent overlapping bracts and the peduncles persistent on older branchlets. Calyx tube 1.2–2.4 mm long, lobes (2–)3, connate in bud, 2–2.5 mm long, bluntly acute, calyx appressed pubescent outside, glabrous inside. Corolla tube 2–2.5 mm long, lobes 3, triangular, 2.4–2.6 mm long, appressed pubescent outside, glabrous inside. Staminodes absent. Ovary 1.8–2 mm long, sericeous, 3-locular, ovules 2 per locule, style 0.5–0.75 mm long, with appressed hairs at base, stigmas bifid. Fruiting calyx trilobed, 5–8 mm diameter, scarcely appressed to base of fruit, the lobes spreading or recurved, fruit globose or broadly ellipsoid, 10–15 mm long, 9–13 mm wide, with scattered appressed hairs, glabrescent; seeds 8–10 mm long. **Fig. 5K–P.**

Additional selected specimens examined: Queensland. COOK DISTRICT: NPR 133, Daintree, above tributary of Mackenzie Creek, WNW of Mt Hutchinson, Sep 2002, *Ford AF3601 & Holmes* (BRI); S of junction of E & W Mulgrave Rivers, SFR 310, Goldfield LA, 20.1 km SSE of Little Mulgrave township, Nov 1988, *Jessup GJM1663 et al.* (BRI); NE slopes of Bartle Frere, in 1995, *Hunter JH2151* (BRI); TR1230, Boonjee LA, Nov 1977, *Gray 772* (BRI, CNS); *loc. cit.*, Jan 1978 *Gray 852* (BRI, CNS); Mt Bartle Frere, 1.8 km WSW of Bobbin Bobbin Falls, 4.4 km NNE Boonjee, Nov 1988, *Jessup GJM1036 et al.* (BRI); Stockwellia track, Wooroonooran NP, Dec 1998, *Forster PIF24054 et al.* (BRI); SFR 755 Gosschalk LA, May 1976, *Hyland 8795* (BRI, CNS); The Boulders, North Babinda Creek, W of Babinda, Dec 1984, *Jessup 708* (BRI); SFR 755, Barong LA, Francis Range, Dec 1984, *Jessup 715 & 716* (BRI); 1.4 km SE of Cooroo Peak at the head of Culla Creek 14 km NW of South Johnstone, Oct 1988, *Jessup GJM2551 et al.* (BRI); Junction of Duffer Creek & Johnstone River, Jul 1992, *Tucker & Sankowsky s.n.* (BRI [AQ547363]); SF 756 Mt Father Clancy, May 2000, *Forster PIF25722 & Booth* (BRI); North Johnstone River, near Palmerston NP, Nov 1982, *Jessup 517* (BRI); Palmerston NP, North Johnstone River, Dec 1984, *Jessup 741* (BRI); Palmerston NP, Tchupalla Falls track, Nov 1982, *Jessup 515* (BRI); Kaaru LA, SW corner 14.5 km SSE of Millaa Millaa, Oct 1988, *Jessup GJM2016 et al.* (BRI); SFR 756 Jordon, Lower Downey LA, Dec 1991, *Gray 5388* (BRI, CNS), *Gray 5389* (BRI, CNS), *Gray 5394* (BRI, CNS); Elinjia LA, 7.4 km NE of Millaa Millaa, Oct 1988, *Jessup GJM2130 et al.* (BRI); Gregory Falls, Lower Palmerston via Innisfail, in 1962, *Webb & Tracey 6680B* (BRI); Mena Creek, Oct 1995, *Gleed s.n.* (BRI [AQ585232]); Liverpool Creek W of Silkwood, Dec 1984, *Jessup 738* (BRI).

Distribution and habitat: *Diospyros pluviatilis* is endemic to northeast Queensland, occurring from near Mt Hutchinson north of the

Daintree River and in the area approximately bounded by the upper reaches of the Mulgrave River, Bellenden Ker township, Mena Creek, Liverpool Creek and Millaa Millaa (**Map 10**), in complex mesophyll or notophyll vineforest, on alluvium or basalt soil.

Phenology: Flowers have been recorded from October to February, and fruit from October, November and May.

Etymology: The species epithet is a Latin adjective meaning ‘relating to rain’ and refers to the natural distribution of this species being within areas of the Wet Tropics recording some of the highest rainfall averages in Australia.

18. *Diospyros rheophila* Jessup sp. nov.; it differs from all other Australian species in its rheophytic habit and leaf lamina length 4–6 times width. **Typus:** Queensland. COOK DISTRICT: Timber Reserve 165, Baird Logging Area, 22 September 1980, *B. Hyland 10623* (holo: BRI).

Diospyros sp. (Baird L.A. B.Hyland 9374); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Baird LA); Cooper & Cooper (2004: 156).

Shrub or tree to 5 m. Twigs with appressed submedifixed hyaline or pale brown hairs, glabrescent. Leaves: petiole 3–4 mm long, flat above, glabrescent; lamina narrowly oblanceolate or narrowly elliptic, 4.3–8 cm long, 1.1–1.4(–1.7) cm wide; base cuneate; glands 2–6 on basal quarter of lamina below; margins slightly recurved; apex rounded or bluntly acute; glabrous above, sparsely appressed pubescent with submedifixed hairs below, glabrescent; midvein more or less flush above, secondary veins 5–10 pairs, often difficult to distinguish from higher order veins. **Male** flowers not seen. **Female** flowers solitary, peduncle 1–2 mm long, pubescent, with caducous bracts. Calyx 3.5–4 mm long, tube 1.5–2 mm long, lobes 3, connate at first then 1.5–2 mm long, mostly obtuse, calyx appressed pubescent, glabrescent outside, appressed pubescent inside. Corolla tube 2–3 mm long, lobes 3, ovate, 2–2.5 mm long, appressed pubescent or coarsely sericeous

outside in the middle of the lobes, glabrous below and inside. Staminodes absent. Ovary 1.7–2 mm long, sericeous, 3-locular, ovules 2 per locule, style 0.75–1 mm long, pubescent at base, stigmas bifid. Fruit not seen. **Fig. 6A&B.**

Additional selected specimens examined: Queensland. COOK DISTRICT: TR 165, Alexandra LA, Jun 1977, *Hyland 9374* (BRI); TR 106, Parish of Noah, Baird LA, Roaring Meg Creek, Jul 1997, *Hyland 2602IRFK* (BRI).

Distribution and habitat: *Diospyros rheophila* is endemic to northeast Queensland growing as a rheophyte amongst rocks and boulders in notophyll vineforest along Roaring Meg Creek, north of Daintree (**Map 10**).

Phenology: The species flowers in September.

Etymology: The specific epithet is from Greek *rheophilus*, loving rivers, in reference to the apparent preferred habitat of the species.

19. Diospyros granitica Jessup **sp. nov.**; allied to *D. pentamera* but differing in the leaf lamina not discoloured and papillate below and the fruiting calyx fully appressed to the base of the fruit with inconspicuous lobes compared to the fruiting calyx with lobes 2–4 mm long and often recurved in *D. pentamera*. **Type:** Queensland. COOK DISTRICT: State Forest Reserve 143, Kanawarra, Carbine Logging Area, 21 December 1988, *B. Hyland 13792* (holo: BRI [2 sheets]).

Diospyros sp. (Mt. Spurgeon C.T. White 10677); Jessup (1994, 1997, 2002, 2007, 2010).

Diospyros sp. (Mt Spurgeon); Cooper & Cooper (2004: 156).

Tree to 15 m. Twigs with appressed long and short basifixed pale brown hairs, glabrescent. Leaves: petiole 3–6 mm long, glabrescent; lamina elliptic, 5–7(–9) cm long, 2–3.8 cm wide; base shortly attenuate; glands mostly 3–8 on basal quarter of lamina below; margins slightly recurved near base; apex acuminate; sparsely appressed pubescent, glabrescent both sides; midvein on upper surface depressed, secondary veins 7–11 pairs, sometimes indistinct, highest order veins \pm parallel. **Male** inflorescence axes solitary or several in axillary fascicles, 1.5–4 mm long, each with 3–5 flowers, appressed pubescent.

Calyx tube 1–1.5 mm long, lobes 4 or 5, 1–1.2 mm long, acute or obtuse; calyx appressed pubescent outside and at base inside. Corolla tube 1.5–1.7 mm long, lobes 4 or 5, broadly ovate, 2.5–2.7 mm long, appressed sericeous outside except margins, appressed puberulous inside. Stamens mostly (15–)16(–17), 3.5–4 mm long, filaments connate at base in pairs and adnate to corolla tube at base, 1.8–2 mm long, pilose just below the anther, the longer hairs as long as the anthers; anthers narrowly ovate, acuminate, 1–1.3 mm long; pistillode *c.* 1 mm long, puberulous towards apex. **Female** flowers often 3 in each axil, each on a pubescent peduncle 2–4 mm long, bracts *c.* 1 mm long, caducous. Calyx tube 2.5 mm long, lobes 4 or 5, 1 mm long, acute or obtuse; calyx appressed sericeous outside and inside, puberulous along lobe margins. Corolla tube *c.* 1.5 mm long, glabrous outside and inside, lobes 4 or 5, 2–2.5 mm long. Staminodes 6–10, like stamens with vestigial anthers, filaments not paired. Ovary 2.5 mm long, sericeous, 3–5-locular, ovules 2 per locule, styles 3–5, 1.5–1.7 mm long, distally free and glabrous just below the lobed stigmas, otherwise appressed pubescent. Fruiting calyx cupular, 8–9 mm diameter, appressed to base of fruit, lobes broadly triangular, indistinct or scarcely visible; fruit obovoid, ellipsoid or subglobose, 10–18 mm long, 10–13 mm wide, glabrescent; mostly 1-seeded; seeds 9–10 mm long. **Fig. 6C–H.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Mt Spurgeon, Sep 1937, *White 10677* (BRI); *loc. cit.*, Nov 1985, *Godwin C2923* (BRI); Near Schillers Hut, Mt Spurgeon, Sep 1972, *Webb & Tracey 11779* (BRI); 32.5 km along Mt Lewis Road from Mossman – Mt Molloy Road, Dec 1989, *Jessup G.JD3366 et al.* (BRI); Mt Lewis Road, S Mary LA, 16 km NNW Mt Molloy, Nov 1988, *Jessup GJM1554 et al.* (BRI), *Jessup GJM1497 et al.* (BRI); SFR 143, Riflemead, Carbine LA, Oct 1988, *Hyland 13587* (BRI), Dec 1988, *Hyland 13798* (BRI), Nov 1987, *Hyland 25237RFK* (BRI), Dec 1988, *Hyland 25628RFK & 25627RFK* (BRI); SFR 143, Parish of Riflemead, Carbine LA, Jan 1988, *Gray 4896* (BRI); SFR 143, Kanawarra, Carbine LA, Dec 1988, *Hyland 13792* (BRI); Mt Lewis, Oct 1971, *Webb & Tracey 10530* (BRI); Mt Bartle Frere, Oct 1891, *Johnson s.n.* (MEL 233340); *loc. cit.*, Jan 1891, *Johnson s.n.* (MEL 233339); Upper Russell River, Jan 1891, *Johnson s.n.* (MEL233337); Mt Bartle Frere, in 1892, *Johnson s.n.* (BRI [AQ519813]); Wooroonooran NP, East Mulgrave River, Nov 2000, *Forster PIF26441 et al.* (BRI); E Bartle Frere, Nov 1994, *Hunter JH1840* (BRI).

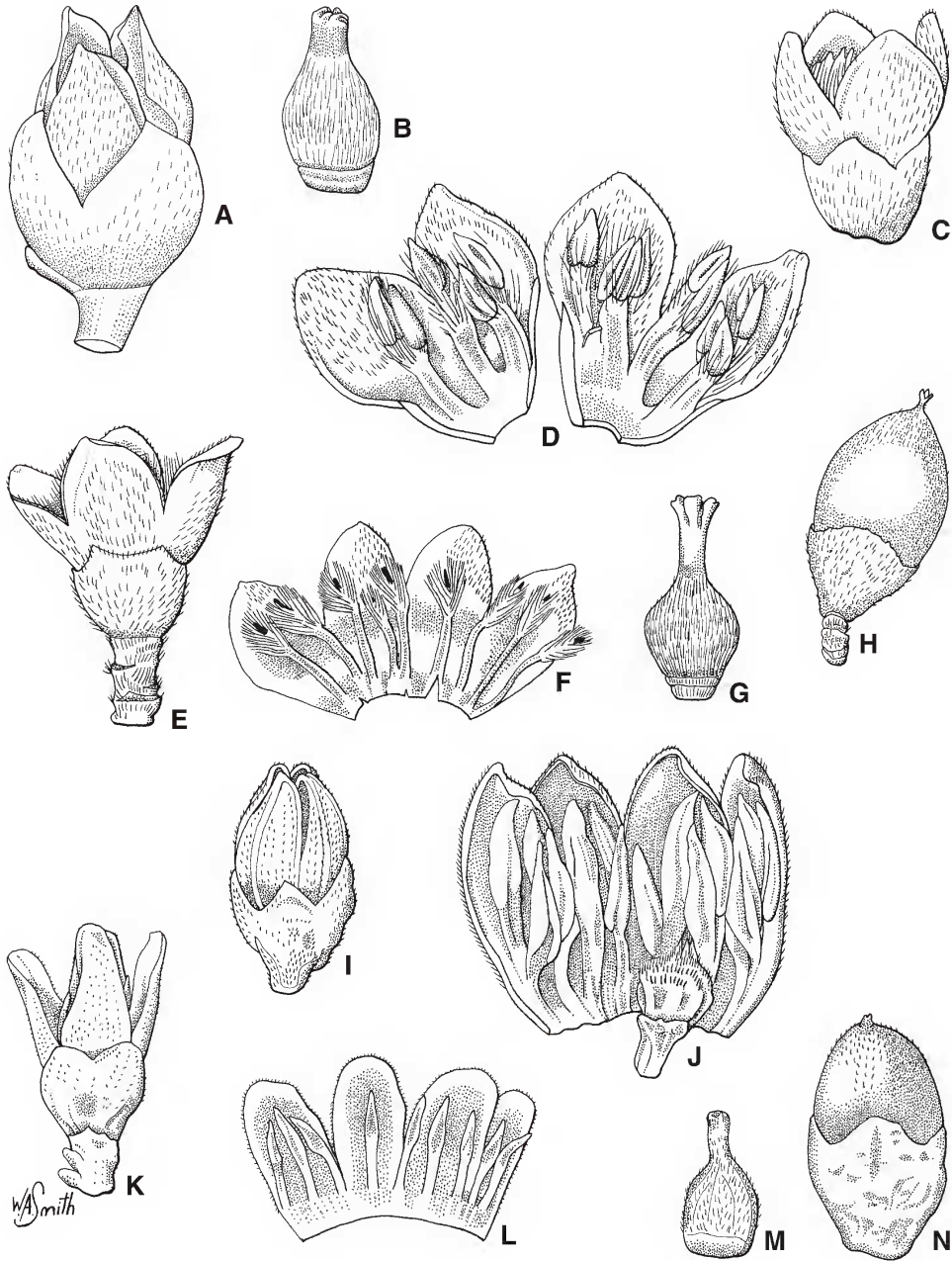


Fig. 6. A, B: *Diospyros rheophila*. A. female flower $\times 6$. B. dissected ovary, female flower $\times 6$. **C–H: *D. granitica*.** C. male flower $\times 6$. D. dissected male corolla and stamens $\times 8$. E. female flower $\times 4$. F. dissected female corolla showing staminodes $\times 4$. G. dissected ovary, female flower $\times 6$. H. fruit $\times 2$. **I–N: *D. australis*.** I. male flower in late bud $\times 6$. J. dissected male flower showing stamens and pistillode $\times 8$. K. female flower $\times 4$. L. dissected corolla showing staminodes, female flower $\times 4$. M. dissected ovary, female flower $\times 4$. N. fruit $\times 2$. A, B from *Hyland 10623* (BRI); C & D from *Hyland 25628RFK* (BRI); E–G from *Hyland 13792* (BRI); H from *Hyland 13587* (BRI); I from *Volck s.n.* (BRI [AQ13088]); J from *Hoy 162* (BRI); K from *Stanley 78179 & Ross* (BRI); L & M from *Grimshaw G286 & Franks* (BRI); N from *Gibson TO1491* (BRI).

Distribution and habitat: *Diospyros granitica* is endemic to northeast Queensland occurring between Mt Spurgeon and Mt Lewis and also on the slopes of Mt Bartle Frere (**Map 11**). It is found in notophyll and microphyll vine-fern forest on granite.

Phenology: Flowers have been recorded in November and December and fruit from July to December.

Etymology: The specific epithet refers to the granite-derived soils in which this species grows.

20. *Diospyros australis* (R.Br.) Hiern, *Trans. Cambridge Philos. Soc.* 12: 30 (1873); *Cargillia australis* R.Br., *Prodr.* 527 (1810). **Type:** New South Wales. Port Jackson, Hawkesbury, Hunter's River, *s.dat.*, *R. Brown iter Austral.* 2828 (syn: BM, E, K).

Maba cargillia F.Muell., *Fragm.* 5: 162 (1866), *pro syn. nom. inval.*, *nom. nud.*

Diospyros cargillea F.Muell., *Austral. Veg.* 35 (1867) *nom. inval.*, *nom. nud.*

Diospyros cargillia F.Muell. ex Hiern *nom. illeg.*, *nom. alt.*; Hiern, *Trans. Cambridge Philos. Soc.* 12: 77, 155, 246, 290, 292 (1873).

Annona microcarpa Jacq., *Fragm. Bot.* 40, t.44 (1800–1809); *Diospyros microcarpa* (Jacq.) Gürke (1890), *nom. illegit.*, *non D. microcarpa* Span. (1836) *et non D. microcarpa* Siebold (1844).

Tree to 30 m. Twigs appressed pubescent with basifixed hairs. Leaves: petiole 3–8 mm long, channelled above, appressed pubescent; lamina oblong, elliptic or narrowly ovate, 3–12 cm long, 1–3.5 cm wide; base cuneate; glands 1–8(–16) on basal half of lamina below; margins sometimes recurved; apex often obtuse or rounded; glabrescent and soon glabrous above, appressed pubescent and minutely papillate below appearing dull pale green; midvein on upper surface shallowly depressed; secondary veins 7–11 pairs, indistinct below. **Male** inflorescence axes solitary or several in axillary fascicles, 1.5–4 mm long, each with 3–5 flowers, appressed pubescent. Calyx tube 2.5–3 mm long, lobes 4, 0.5–0.7 mm long, obtuse; calyx

appressed pubescent outside, glabrous inside. Corolla tube 1.5–1.6 mm long, lobes 4, ovate or oblong, 4–5 mm long, appressed pubescent outside, glabrous inside. Stamens 12–16, 3–4 mm long, filaments connate at base in pairs and adnate to corolla tube at base, 1–2 mm long, glabrous; anthers narrowly lanceolate, 2–2.5 mm long, glabrous; pistillode *c.* 2 mm long, pubescent, with glabrous rudimentary styles. **Female** flowers 1–3 in each axil, each on a pubescent peduncle to 2.5 mm long, bracts navicular, 2–3 mm long, caducous. Calyx tube 2.5–3 mm long, lobes 4, 1–1.3 mm long, acute or obtuse; calyx appressed pubescent outside and inside on lobes. Corolla tube 1.5–1.7 mm long, glabrous outside and inside, lobes 4–6, oblong, 3.5–4.5 mm long. Staminodes 8–15, like stamens with sterile anthers, filaments not paired. Ovary 2.5–3 mm long, sericeous, 4-locular, ovules 2 per locule, style 1.5–1.7 mm long, appressed pubescent but glabrous just below the lobed stigmas. Fruiting calyx cupular, 10–12 mm diameter, appressed to base of fruit, lobes broadly triangular, *c.* 2 mm long; fruit ovoid or subglobose, 11–14 mm long, 9–10 mm wide, appressed pubescent; mostly with 1 seed; seeds 7–8 mm long. **Fig. 6I–N.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Candlenut Scrub, SF 144 Mt Windsor Tableland, Nov 1997, *Forster PIF21883 et al.* (BRI); Danbulla, R185, Oct 1953, *Volck s.n.* (BRI [AQ13088]); SFR 194, Sylvia LA, NE of Walsh Falls, Sep 1998, *Ford 2104* (BRI). NORTH KENNEDY DISTRICT: Mount Aberdeen NP, 40 km inland from Bowen, Mar 1989, *Fell DF1822* (BRI). SOUTH KENNEDY DISTRICT: Dalrymple Heights and vicinity, Sep–Nov 1947, *Clemens s.n.* (BRI [AQ183475]). PORT CURTIS DISTRICT: 2.5 km SW of Raglan, R146, Horrigan Creek, Mar 1989, *Gibson TOI491* (BRI); 20 km from Agnes Water, S of Gladstone, Nov 1978, *Stanley 78179 & Ross* (BRI). LEICHHARDT DISTRICT: Buckland Creek, Carnarvon Range, *s.dat.*, *Jensen s.n.* (BRI [AQ183462]). MARANOVA DISTRICT: Carnarvon NP, Mount Moffatt Section, gully to the north of Marlong Plain, Nov 1996, *Eddie 19* (BRI). BURNETT DISTRICT: Cania Gorge NP, along track to Dripping Rock, Oct 1999, *Halford Q3858* (BRI); Mt Walsh NP, track to Coongara Rock, 15 km SSW of Biggenden, Coast Range, Nov 2007, *Forster PIF33148* (BRI); 6 km NNW of Coalstoun Lakes, Apr 1991, *Forster PIF7848* (BRI); Bunya Mountains, between Noolers Lookout & Mt Kiargarow, Dec 1954, *Smith 6256* (BRI). WIDE BAY DISTRICT: 1 km SW of Booyal, Childers, Nov 1987, *Forster PIF3294* (BRI); Jimna Range Road, Kilcoy to Goomeri, north of Jimna township, Dec 1993, *Grimshaw G286 & Franks* (BRI). DARLING DOWNS DISTRICT: Mt Colliery

to Gambubal Road, western fall of the Main Range, NE of Killarney, Jan 2012, *Forster PIF38565 & Leiper* (BRI). MORETON DISTRICT: Riverside Drive near Ipswich Mining Museum, Raymonds Hill near Coal Creek, Mar 1994, *Grimshaw G514* (BRI); Black Rock Creek scrub, 13 km S of Boonah, Mar 1991, *Forster PIF7815* (BRI). **New South Wales.** NORTH COAST: Nymboida River, near Bibiranga Road, 11 km S of Nymboida, May 1994, *Bean 7726* (BRI); Beecroft Peninsula, 6.3 km NNW of Point Perpendicular, S end of Long Beach, Dec 1988, *Winsbury 86 et al.* (BRI); Bolaro Mountain Road, 9 km from Kings Highway, Feb 1988, *Richardson 153 et al.* (BRI).

Distribution and habitat: *Diospyros australis* occurs in eastern Australia, from Mt Windsor Tableland, northeast Queensland to near Batemans Bay, NSW, also inland at Carnarvon Gorge and vicinity in Queensland (**Map 12**), mostly in microphyll to notophyll vine forest on a variety of soil types.

Phenology: Flowers have been recorded from August to December and fruit from January to September.

21. *Diospyros pentamera* (Woolls & F.Muell. ex F.Muell.) F.Muell., *Austral. Veg.* 35 (1867); *Cargillia pentamera* Woolls & F.Muell. ex F.Muell., *Fragm.* 4: 82 (1864). **Type:** New South Wales. Clarence River, *s.dat.*, *C. Moore s.n.* (lecto [here designated]; MEL 232965).

Cargillia arborea A.Cunn. ex Hiern, *Trans. Cambridge Phil. Soc.* 12: 239 (1873), *nom. inval., pro. syn.*

Illustration: Cooper & Cooper (2004: 156).

Tree to 35 m. Twigs with appressed long basifixed pale brown hairs, glabrescent. Leaves: petiole 2–6 mm long, glabrescent; lamina elliptic or lanceolate, 3–10 cm long, 1–4 cm wide; base attenuate; glands mostly 2–10 on lamina below; margins slightly recurved near base; apex acuminate; sparsely appressed pubescent, glabrescent both sides, minutely papillate below appearing dull pale green and discoloured; midvein on upper surface depressed; secondary veins 7–11 pairs, sometimes indistinct. **Male** inflorescence axes solitary or few in leaf axils, each axis 4–12 mm long, each with 3–10 flowers, appressed pubescent. Calyx tube 1.5–1.7 mm long, lobes (4–)5(–6), 1.2–1.4 mm long, acute; calyx appressed pubescent outside, glabrous inside. Corolla tube 1.5–1.7 mm long, lobes

mostly 5, narrowly ovate or oblong, 3–3.5 mm long, appressed pubescent outside but glabrous on the overlapped margin and inside. Stamens 15–20, 3.7–4.5 mm long, filaments connate at base in pairs or alternipetalous ones sometimes single and adnate to corolla tube at base, 1–2 mm long, glabrous towards base, pilose just below anthers; anthers linear-rostellate, 2.5–3 mm long, connective pilose; pistillode *c.* 1 mm long, pubescent. **Female** flowers 1(–3) in each axil, each on a pubescent peduncle 1.5–5 mm long, bracts caducous. Calyx tube 2.5–3 mm long, lobes (4–)5, 2–2.5 mm long, obtuse; calyx appressed pubescent outside and inside. Corolla tube 1.5–2.2 mm long, glabrous outside and inside, lobes (4–)5, oblong or narrowly ovate, 3–3.8 mm long. Staminodes 10–12, like stamens with sterile anthers, filaments single or paired. Ovary 2–2.5 mm long, sericeous, 3-locular, ovules 2 per locule, style 1.7–2 mm long, appressed pubescent, 3-branched for nearly half its length and glabrous just below the stigmas. Fruiting calyx cupular, 10–12 mm diameter, appressed to base of fruit, lobes broadly triangular, 2–4 mm long; fruit ovoid or subglobose, 14–18 mm long, 10–15 mm wide, appressed pubescent, glabrescent, 1–4-seeded; seeds 8–12 mm long. **Fig. 7A–F.**

Additional selected specimens examined: Queensland. COOK DISTRICT: Daintree NP, Adeline Creek headwaters, Candlenut scrub, May 1999, *Forster PIF24569 & Booth* (BRI); SFR 144 Mt Windsor Tableland, Oct 1979, *Moriarty 2685* (BRI); SFR 607, Parish of Cairns, Shoteel LA, Sep 1986, *Gray 4359* (BRI). NORTH KENNEDY DISTRICT: Scrubby Creek, Herberton Range, Nov 1929, *Kajewski 1359* (BM, BRI); Mt Fox, Nov 1949, *Clemens s.n.* (BRI [AQ416986]); Mt Aberdeen NP, west of Bowen, May 1992, *Forster PIF9964 et al.* (BRI). SOUTH KENNEDY DISTRICT: SF 679 Crediton, Clarke Range, Apr 2000, *Forster PIF25525* (BRI). PORT CURTIS DISTRICT: Resumption LA, SF 391, Bulburin, Dec 1993, *Forster PIF14521 et al.* (BRI). WIDE BAY DISTRICT: *c.* 2 km from Dundowran Beach on road to Hervey Bay, Nov 1978, *Stanley 78125 & Ross* (BRI); Mary River Heads, Pialba, Nov 1987, *Forster PIF3458 et al.* (BRI); top of Wooroonga Range, *c.* 15 km NE of Biggenden, Jun 1979, *Young 201 & Randall* (BRI). BURNETT DISTRICT: Dripping Rock, Cania Gorge NP, Mar 1997, *Kampf et al. s.n.* (BRI); roadside opposite entrance to Paradise Falls carpark, Bunya Mountains NP, Dec 2008, *Young 2412* (BRI). MORETON DISTRICT: Brolga Park, Dulong Road, *c.* 6 km SW of Nambour, Dec 1989, *Sharpe 4928 & Bean* (BRI); Wards Scrub, W of Samford near headwaters of South Pine River, Dec 1983, *Jessup 578 & Guymer* (BRI); Beechmont Ridge, Beechmont, Macpherson Range, Oct

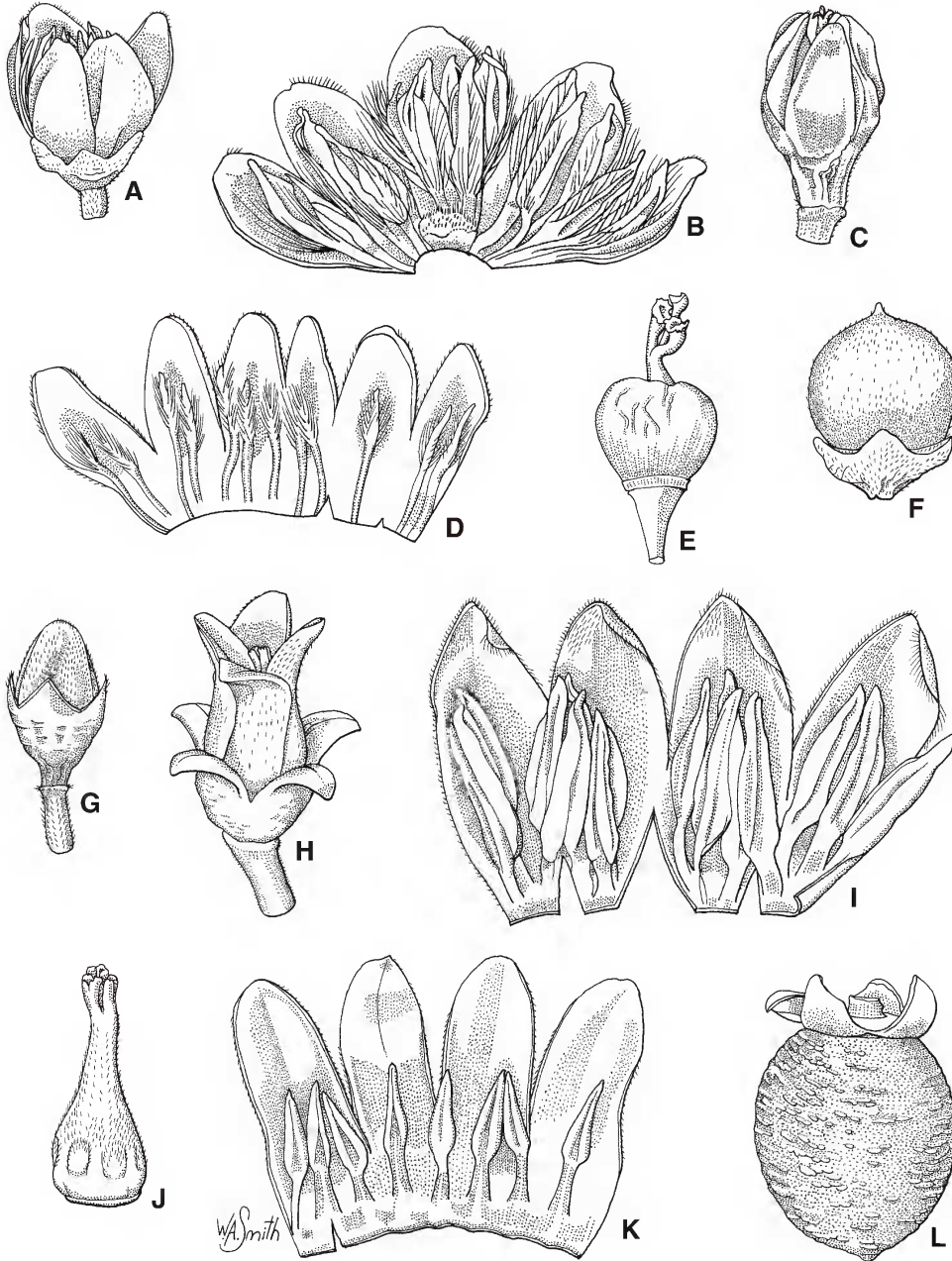


Fig. 7. A–F: *Diospyros pentamera*. A. male flower $\times 4$. B. dissected corolla showing stamens and pistillode, male flower $\times 6$. C. female flower $\times 4$. D. dissected corolla showing staminodes, female flower $\times 6$. E. dissected ovary, female flower $\times 6$. F. fruit $\times 2$. **G–L: *Diospyros mabacea*.** G. male flower bud $\times 4$. H. female flower $\times 3$, I. dissected corolla showing stamens, male flower $\times 8$. J. dissected ovary, female flower $\times 4$. K. dissected corolla showing staminodes, female flower $\times 4$. L. fruit $\times 1.5$. A, B from Stanley 78125 & Ross (BRI); C from Jessup 578 & Guymer (BRI); D from Forster PIF3454 et al. (BRI); E from Smith 3618 & Webb (BRI); F from Grimshaw G84 (BRI); G, H from Baeuerlen 1531 (BRI); I–K from Murray s.n. (BRI [AQ651258]); L. reconstructed from Baeuerlen 1531 (BRI) and unvouchered photo.

1969, *Schodde 5590* (BRI); O'Reilly's, Lamington NP, May 1948, *Smith 3618 & Webb* (BRI); Qld/NSW border fence reserve near 'Wild Mountain' property, Levers Plateau, Oct 1993, *Grimshaw G84* (BRI). **New South Wales.** NORTH COAST: Glenugie Peak, c. 12 miles [20 km] SE of Grafton, Nov 1965, *Constable 6408* (BRI); Dorrigo SF, Oct 1930, *White 7512* (BRI). CENTRAL COAST: 3 miles [4.8 km] W of Kiama on Jamberoo Road, Illawarra District, Mar 1964, *Schodde 3474* (BRI).

Distribution and habitat: *Diospyros pentamera* is endemic to the eastern coast of Australia, south of Cape Tribulation, northeast Queensland to south of Kiama, New South Wales (**Map 13**). It occurs in various types of rainforest from sea level to at least 1100 m altitude.

Phenology: Flowers have been recorded from September to May and fruit from February to July, also October and December.

22. *Diospyros mabacea* (F.Muell.) F.Muell., *Syst. Census of Austral. Pl.* 92 (1883); *Cargillia mabacea* F.Muell., *Fragm.* 5: 162 (1866). **Type:** New South Wales. Tweed River, *s.dat.*, *C. Moore s.n.* (holo: MEL 92384; iso: K 792758).

Tree to 25 m. Twigs with erect or antrorse basifixed pale brown hairs, glabrescent. Leaves: petiole 3–8 mm long, glabrescent; lamina narrowly elliptic or oblanceolate, 6–16 cm long, 2–5 cm wide; base shortly attenuate; margins recurved near base; glands mostly 2–10 scattered on lamina below; apex acuminate; glabrous above except main veins, sparsely appressed pubescent, glabrescent below; midvein on upper surface depressed, secondary veins 9–13 pairs. Male inflorescence a fascicle of cymes, each axis 3–4 mm long, each fascicle with up to 6 flowers, pubescent, bracts narrowly ovate, persistent. Calyx tube 2–2.3 mm long, lobes 4, 0.7–1.2 mm long, acute or obtuse; calyx sparsely appressed pubescent, glabrescent outside, glabrous inside. Corolla tube 2–2.5 mm long, lobes 4, narrowly ovate or oblong, 3.5–4 mm long, appressed pubescent outside but glabrous on the overlapped margin and inside. Stamens 15 or 16, 4–4.5 mm long, filaments connate at base in pairs and adnate to corolla tube at base, 1–1.5 mm long, glabrous; anthers subulate, 2.4–2.8 mm long, glabrous

or with a few short hairs on the connective; pistillode c. 1 mm long, pubescent. Female flowers 1(–3) in each axil, each on a pubescent peduncle 4–6 mm long, bracts oblong, persistent. Calyx tube 2.5–3 mm long, lobes 4, 4–4.5 mm long, obtuse; calyx sparsely appressed pubescent outside, glabrous inside. Corolla tube 2–3 mm long, glabrous outside and inside, lobes 4, oblong, 6–7 mm long, apex rounded, recurved. Stamines 8, like stamens with sterile anthers, filaments single. Ovary 3–3.7 mm long, appressed pubescent, 4-locular, ovules 2 per locule, style 3–4 mm long, appressed pubescent, but glabrous and scarcely branched below the stigmas. Fruiting calyx with recurved lobes 5–6 mm long; fruit ovoid, narrowly ovoid or ellipsoid, 25–45 mm long, glabrescent, 2–6-seeded; seeds 17–20 mm long. **Fig. 7G–L.**

Additional selected specimens examined: **New South Wales.** NORTH COAST: Murwillumbah, Oct 1896, *Baerleren 1531* (BRI, NSW); Oxley River, Tyalgum Showground, Dec 1983, *Floyd AGF2029* (BRI, NSW); 6 km NW of Tyalgum, 300 m NW beyond end of Butlers Road, Feb 1990, *Davies 1553a & Richardson* (BRI); Oxley River Middle Arm Creek, just beyond end of Butlers Road, NW of Tyalgum, Jul 1981, *Gymer 1586 & Jessup* (BRI, CANB, NSW); Oxley River tributary, Eungella, Dec 1983, *Floyd AGF2030* (BRI, NSW); Portion 23, Parish of Chillingham on E bank of Hopping Dicks Creek, Oct 1996, *Murray s.n.* (BRI [AQ651258], NSW); Murwillumbah, Sep 1900, *Campbell s.n.* (NSW 26402), Nov 1900, *Campbell s.n.* (NSW 274846), Mar 1901 *Campbell s.n.* (NSW 274851); Tweed River District, Oct 1901, *Campbell s.n.* (BM); Tweed River, North Arm, Mar 1917, *Runners s.n.* (NSW); main arm of Brunswick River, c. 3 km W of Mullumbimby, Feb 1998, *O'Donovan s.n.* (NSW).

Distribution and habitat: *Diospyros mabacea* is restricted to northeast New South Wales, occurring in the Tweed and Brunswick River valleys (**Map 11**). The species is found in lowland complex notophyll vine forest.

Phenology: Flowers and fruit have been recorded in October.

Notes: *Diospyros mabacea* is listed as **Endangered** under the Environment Protection and Biodiversity Conservation Act 1999 and the NSW Threatened Species Conservation Act 1995.

Excluded names

Diospyros cordifolia Roxb., *Pl. Coromandel* 1: 38, t. 50 (1795).

Australian specimens referred to this name by Bentham (1868: 286) are *D. rugosula*.

Diospyros ellipticifolia (Stokes) Bakh., *Gard. Bull. Straits Settlem.* 7: 162 (1933); *Ferreola ellipticifolia* Stokes, *Bot. Mat. Med.* 4: 556 (1812), *nom. illeg. et nom. superfl. pro Maba elliptica* J.R.Forst. & G.Forst., *Char. Gen. Pl.*, ed. 2. 122, t. 61 (1776); *Ebenus elliptica* (J.R.Forst. & G.Forst.) Kuntze, *Revis. Gen. Pl.* 2: 408 (1891).

Smith (1971) noted that *Ferreola ellipticifolia* Stokes is an illegitimate name because it was published with *Maba elliptica* J.R.Forst. & G.Forst. in synonymy. However, he then used the illegitimate combination *D. elliptica* (J.R.Forst. & G.Forst.) P.S.Green (a later homonym of *D. elliptica* Knowlt. (Dorr 2011). Australian specimens identified as this species (as the f. *australiensis*) by Bakhuizen van den Brink (1941: 65, 429) are referable to *D. yandina*.

Diospyros ferrea (Willd.) Bakh., *Gard. Bull. Straits Settlem.* 7: 162 (1933); *Ehretia ferrea* Willd., *Phytographia* 4 (1794).

Bakhuizen van den Brink (1941: 57) stated “inter tropicos Africae, Asiae et Australiae dispersa”; however, no Australian specimens were actually cited. Bakhuizen van den Brink used species rank taxa to be all encompassing, with the actual taxa that could be related to species in a modern sense, usually circumscribed as varieties or forma.

Diospyros ferrea f. *lamponga* (Miq.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 434, 440 (1941); *Maba lamponga* Miq., *Fl. Ned. Ind., Eerste Bijv.* 3: 584 (1861).

Bakhuizen van den Brink (1941: 434) stated ‘Habitat in Australia ore tropicali et in Insulinde’; however, no Australian specimens were actually cited.

Diospyros longipes Hiern, *J. Bot.* 52: 338 (1914). **Type citation:** “Townsville, Queensland, 11 Aug. 1913, R.H. Cambage”.

Bakhuizen van den Brink (1941: 49) referred this material to *Mimusops elengi* L. (Sapotaceae).

Diospyros major (G.Forst.) Bakh., *Bull. Jard. Bot. Buitenzorg* ser. 3, 15: 429 (1941), *adnot. Maba major* G.Forst.

This was proposed by Bakhuizen van den Brink (1941: 429) as an alternative name to *D. ellipticifolia* (Stokes) Bakh. (see above). The name was misapplied by Jacobs & Pickard (1981: 111) to material from New South Wales; however, no specimens were cited at the time.

Diospyros montana Roxb., *Pl. Coromandel* 1: 37, 48 (1795).

Australian specimens referred to this species by Bakhuizen van den Brink (1938: 265, 1941: 265–270) are *D. rugosula*. According to Kostermans (1981: 22), *D. montana* is restricted to southern India and Ceylon (Sri Lanka).

Diospyros montana f. *cordifolia* (Roxb.) Hiern, *Trans. Cambridge Philos. Soc.* 12: 222 (1873); *D. cordifolia* Roxb., *Pl. Coromandel* 1: 38, t. 50 (1796).

Australian specimens referred to this name are *Diospyros rugosula*.

Maba rufa Labill., *Sert. Austro-Caledon.* 33: t. 36 (1824).

Australian material identified with this name by Hiern (1873: 114), Bailey (1900: 963, t. XL) and Bakhuizen van den Brink (1941: 444) is referable to *Diospyros cupulosa*. *Maba rufa* is a New Caledonian endemic now known as *D. labillardierei* F.White.

Diospyros whyteana (Hiern) F.White, *Bothalia* 7: 488 (1961).

In Australia this species is only known from cultivated plants (Taplin & Symon 2008: 85).

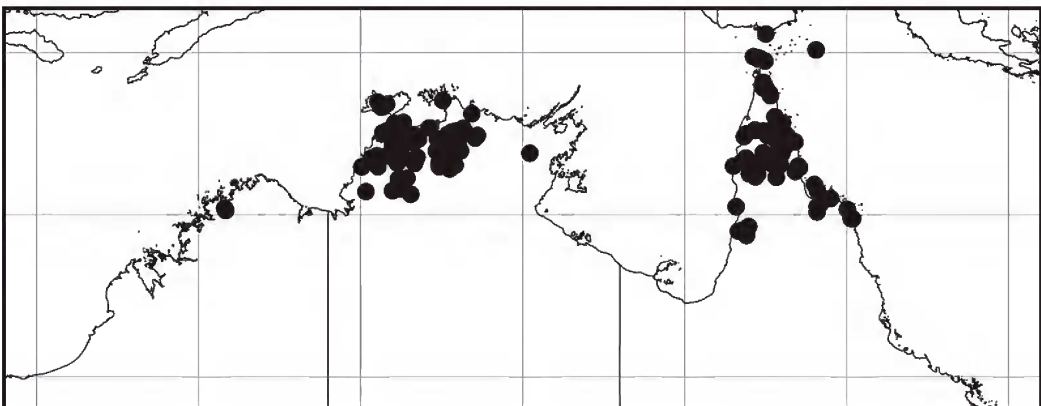
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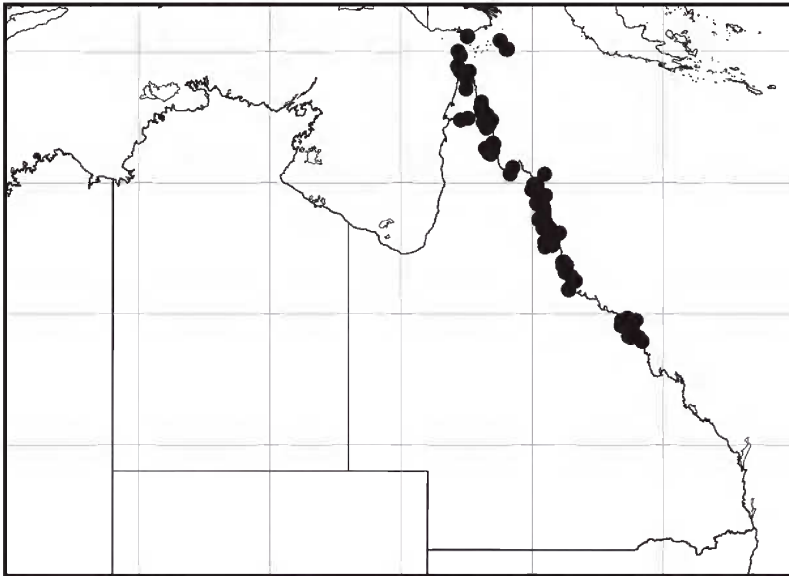
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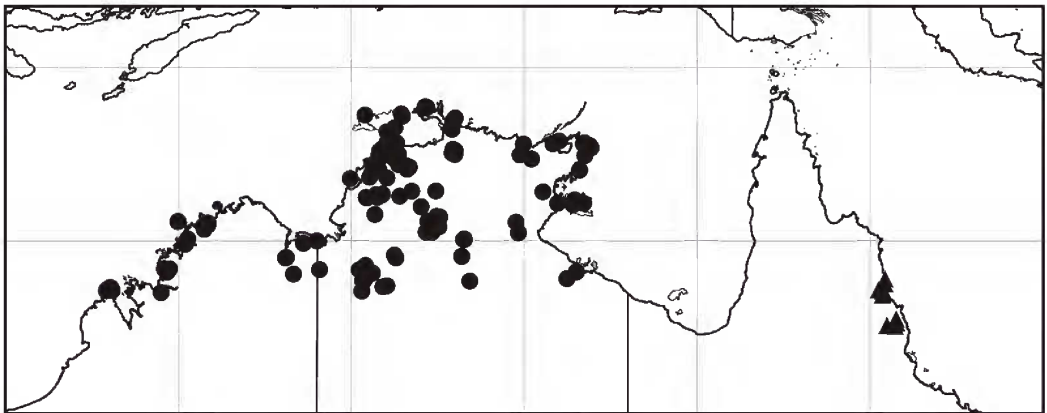
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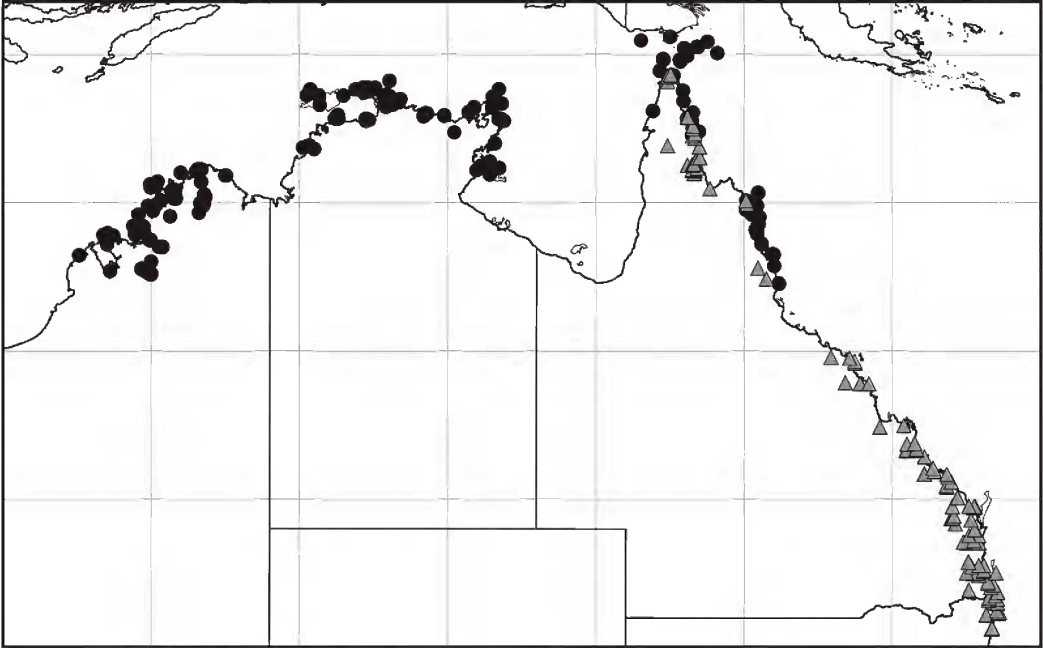
Map 1. Distribution of *Diospyros calycantha* in Australia.



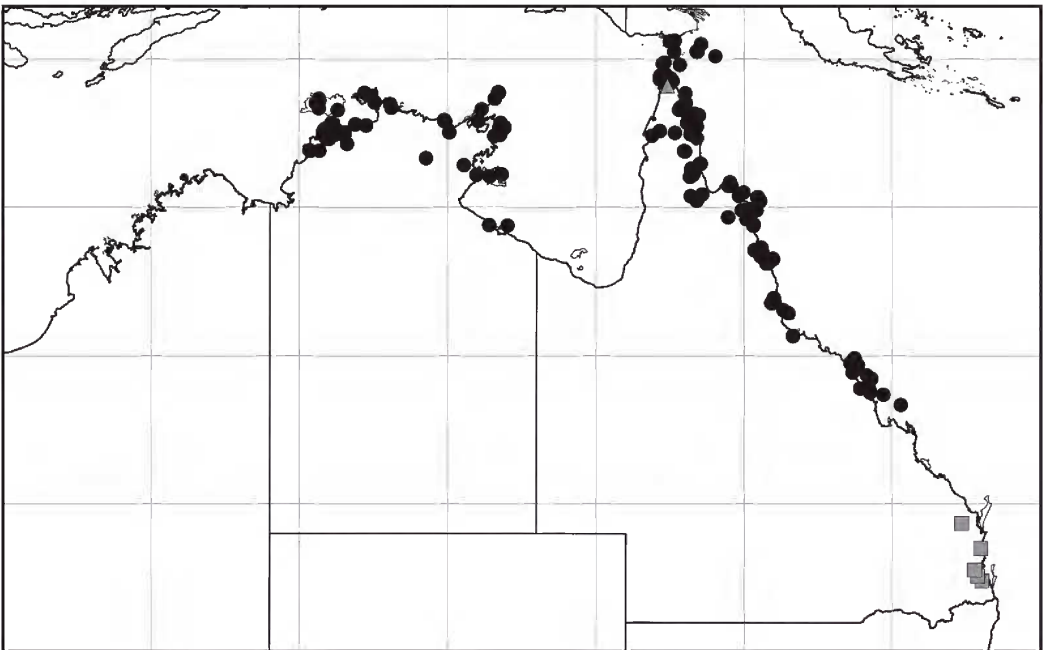
Map 2. Distribution of *Diospyros hebecarpa* in Australia.



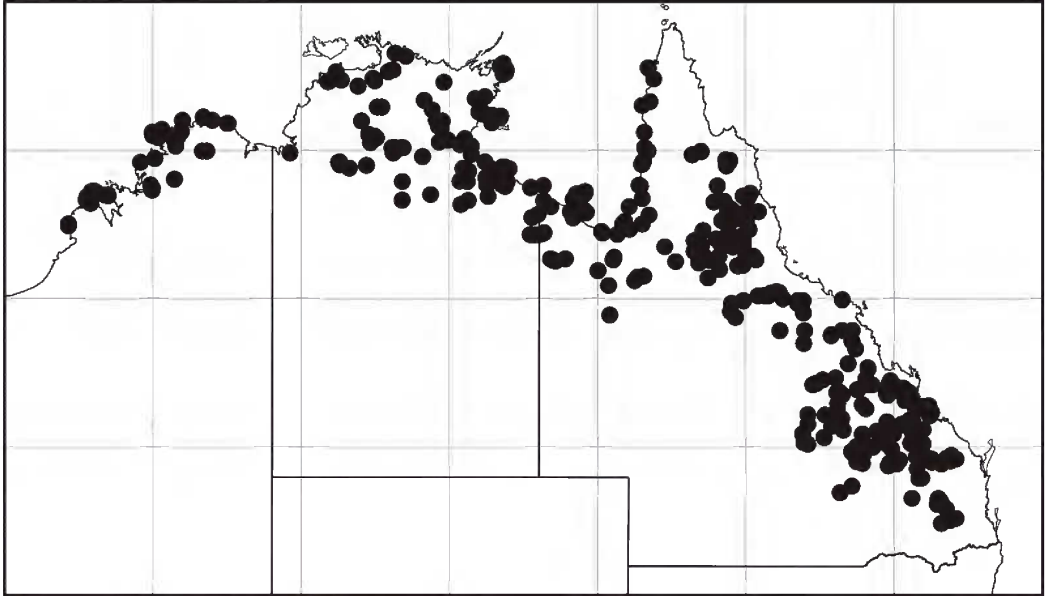
Map 3. Distribution of *Diospyros rugosula* ● and *D. uvida* ▲ in Australia.



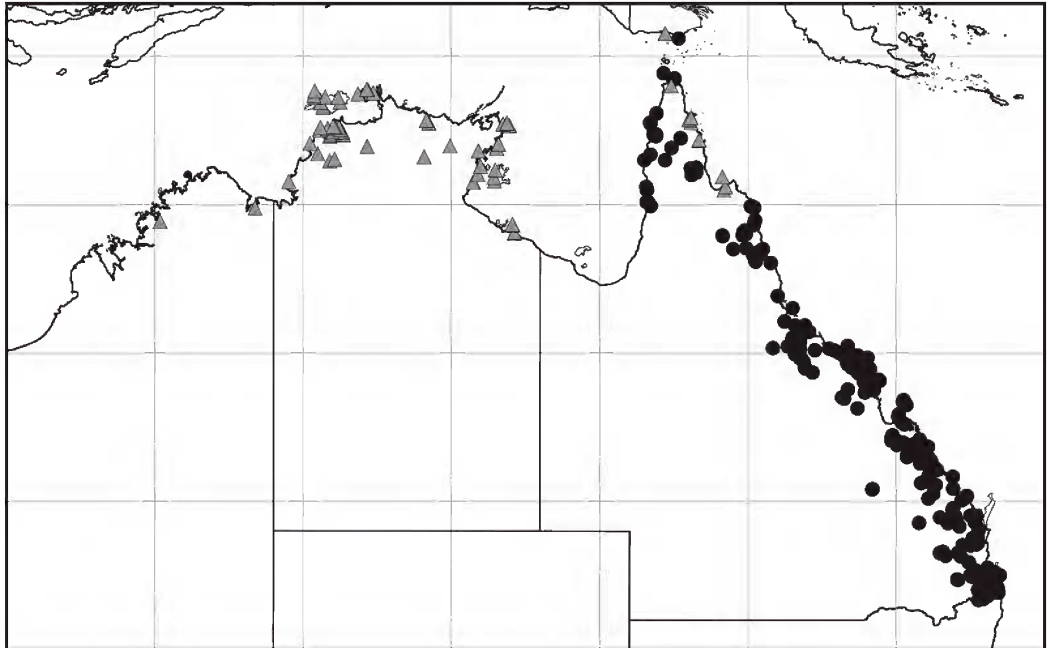
Map 4. Distribution of *Diospyros maritima* ● and *D. fasciculosa* ▲ in Australia.



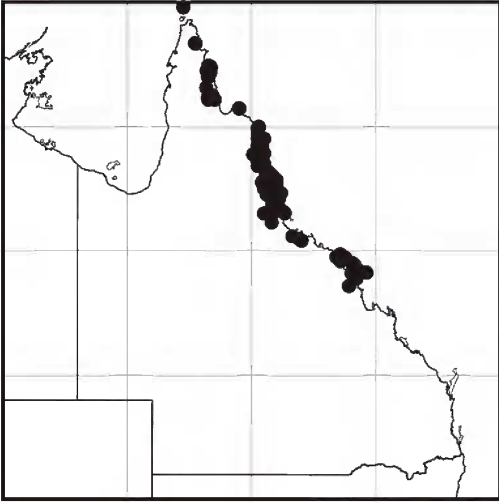
Map 5. Distribution of *Diospyros areolifolia* ▲, *D. compacta* ● and *D. kaki* ■ in Australia.



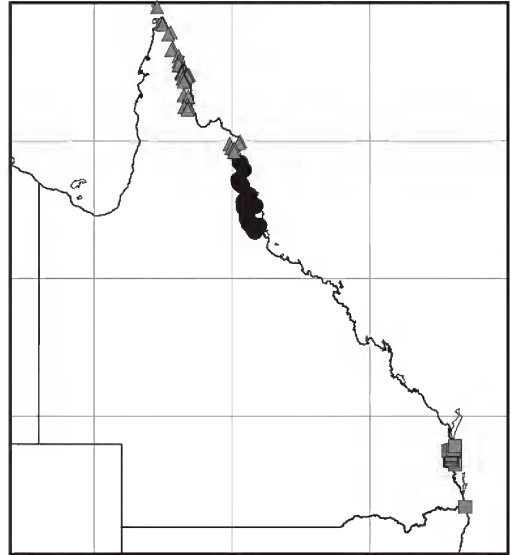
Map 6. Distribution of *Diospyros humilis* in Australia.



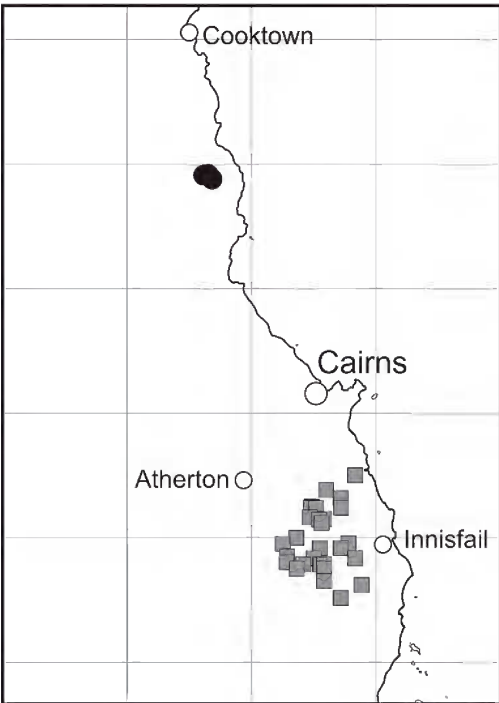
Map 7. Distribution of *Diospyros geminata* ● and *D. littorea* ▲ in Australia.



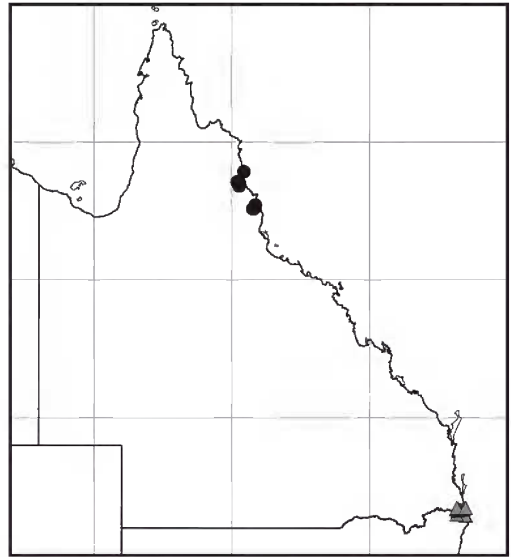
Map 8. Distribution of *Diospyros laurina* in Australia.



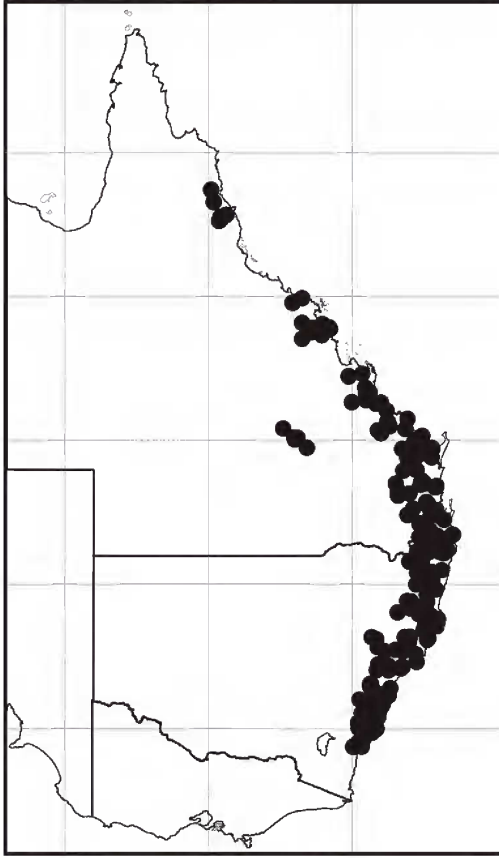
Map 9. Distribution of *Diospyros peninsularis* ▲, *D. hemicycloides* ● and *D. yandina* ■.



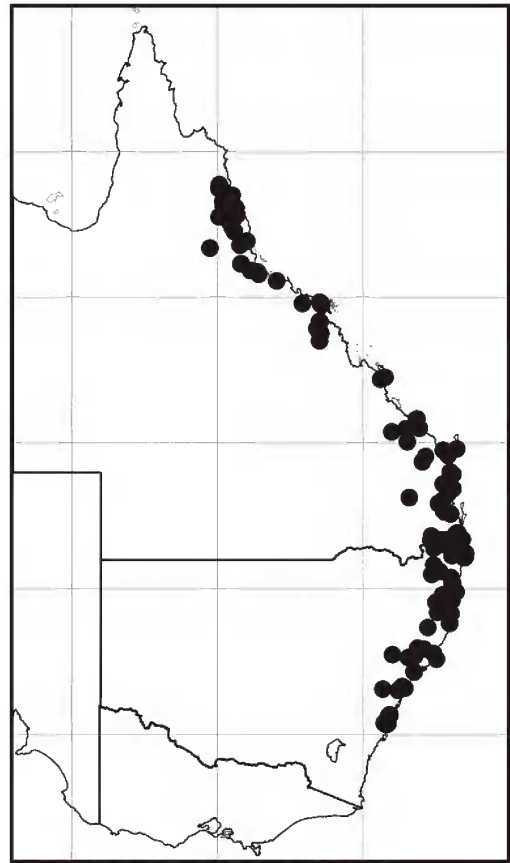
Map 10. Distribution of *Diospyros pluviatilis* ■ and *D. rheophila* ●.



Map 11. Distribution of *Diospyros granitica* ● and *D. mabacea* ▲.



Map 12. Distribution of *Diospyros australis*.



Map 13. Distribution of *Diospyros pentamera*.